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RHEUMATIC HEART DISEASE IN PHILADELPHIA HOSPITALS ¹

A Study of 4,653 Cases of Rheumatic Heart Disease, Rheumatic Fever, Sydenham's Chorea, and Subacute Bacterial Endocarditis Involving 5,921 Admissions to Philadelphia Hospitals From January 1, 1930, to December 31, 1934

III. FATAL RHEUMATIC HEART DISEASE AND SUBACUTE BACTERIAL ENDOCARDITIS

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Among the 5,921 admissions involving rheumatic heart disease, rheumatic fever, Sydenham's chorea, and subacute bacterial endocarditis to Philadelphia hospitals from January 1, 1930, to December 31, 1934, 1,020, or 17.2 percent, are known to have terminated fatally. These deaths occurred during the period under study or before the end of an admission begun prior to January 1, 1935. Excluding subacute bacterial endocarditis apparently not superimposed on rheumatic heart disease, death was attributed to rheumatic conditions in 916, or 15.8 percent, of 5,801 admissions. Of the 4,869 admissions involving rheumatic heart disease, some of which were complicated by rheumatic fever and Sydenham's chorea, 732, or 15.0 percent, resulted fatally.

Of 4,653 cases (in contradistinction to admissions) of rheumatic heart disease, rheumatic fever, Sydenham's chorea, and subacute bacterial endocarditis, 21.9 percent ended fatally. Excluding subacute bacterial endocarditis apparently not superimposed on rheumatic heart disease, death occurred among 916, or 20.2 percent, of 4,538 cases with various rheumatic manifestations, including subacute bacterial endocarditis superimposed on rheumatic heart disease. Of 3,445 cases of rheumatic heart disease, excluding all subacute bacterial endocarditis, 732, or 21.3 percent, terminated in death.

CAUSE OF FINAL ADMISSION

Subacute bacterial endocarditis apparently not engrafted on rheumatic heart disease was the cause of death in 104, or 10.2 percent, of

¹ From the Division of Infectious Diseases, National Institute of Health.

these 1,020 fatal cases. Of the 916 fatal cases involving rheumatic heart disease, 677, or 73.9 percent, were admitted primarily for rheumatic heart disease, rheumatic fever, or Sydenham's chorea; 184, or 20.1 percent, for subacute bacterial endocarditis superimposed on rheumatic heart disease; 21, or 2.3 percent, for obstetrical conditions; 17, or 1.8 percent, for medical conditions unrelated to rheumatic infection or heart disease; while 17, or 1.8 percent, were admitted for surgical conditions, including 4 tonsillectomies. Of the entire series of 1,020 fatal cases, 288, or 28.2 percent, were admitted primarily for subacute bacterial endocarditis. Of the 916 fatal cases of rheumatic heart disease, 94.0 percent were admitted for rheumatic conditions.

CAUSE OF DEATH

The cause of 104 deaths, 10.2 percent of the entire series of 1,020 fatal cases, was subacute bacterial endocarditis, the relation of which to rheumatic heart disease was not determined. Of the 916 fatal cases of rheumatic heart disease, 901, or 98.4 percent, were due primarily to rheumatic heart disease including deaths from subacute bacterial endocarditis when occurring as a complicating factor.

The causes of the other 15 deaths were:

	<i>Number of deaths</i>
Empyema.....	1
Heat stroke.....	1
Automobile accidents.....	2
During surgical operations (possibly due in part to rheumatic heart disease).....	3
Anterior poliomyelitis.....	1
Diabetes mellitus.....	2
Hypertensive cardiovascular disease.....	1
Puerperal sepsis.....	1
Postpartum hemorrhage.....	2
Extrauterine pregnancy.....	1
Total.....	15

Since only 1.6 percent of these 916 deaths were attributable to conditions other than rheumatic heart disease and its sequellae, these deaths do not influence the situation to any great extent; consequently, they will not be considered in detail.

With one possible exception, review of the hospital records of these 916 fatal cases indicated that all were due to rheumatic heart disease. The case in point was a 2-year-old child who was admitted during the first attack of rheumatic fever and apparently died of rheumatic pneumonitis. No necropsy was obtained. In view of the age of the patient and the likelihood that clinical signs of heart disease were obscured by the pulmonary condition, there is more than a strong presumption that the patient also had fulminating rheumatic carditis.

Serious involvement of the lungs in rheumatic fever in the absence of active rheumatic cardiac disease is extremely rare.

Rheumatic fever occurred during 74 admissions which terminated fatally, while Sydenham's chorea was indicated during the final admission in 6 fatal cases. The arthritic manifestations of rheumatic fever and the cerebral manifestations of chorea were never sufficient to cause death. No deaths occurred among patients with these conditions unless rheumatic heart disease was also present. This emphasizes the fact that rheumatic heart disease constitutes the crux of this problem. Incidentally, from the viewpoint of vital statistics, deaths attributed to rheumatic fever or Sydenham's chorea should be considered as due to rheumatic heart disease, since if the diagnosis is correct they are almost invariably due to cardiac involvement.

Davis and Weiss (1) reported 474 cases of rheumatic heart disease among 5,215 consecutive post-mortem examinations at the Boston City Hospital. Rheumatic heart disease was directly responsible for death in 164 cases, or 34.6 percent, while infective endocarditis, either acute or subacute, superimposed on rheumatic heart disease was the cause of an additional 13 percent of deaths. Rheumatic heart disease was a contributory factor in 41 instances, or 8.6 percent of the fatal cases. In 205, or 43.2 percent, of the 474 fatal cases with rheumatic heart disease, the character of the cardiac involvement indicated that rheumatic heart disease was not the cause of death. The reason for the marked difference in the percentage of deaths directly attributable to rheumatic heart disease is presumably because Davis and Weiss' series consisted of consecutive post-mortem examinations. Rheumatic cardiac lesions which were not diagnosed clinically were probably often discovered at necropsy. In the present series, most of the patients were admitted for rheumatic heart disease and succumbed to that condition. A careful autopsy study of persons in Philadelphia dying from other conditions would probably reveal cases of rheumatic heart disease undetected during life.

PLACE OF DEATH

According to table 1, 962, or 94.3 percent, of these 1,020 deaths occurred in hospitals. A search of the records of the local office of vital statistics of the State Department of Health indicated that 54 patients, or 5.3 percent, died before the end of 1934 after discharge from a hospital. A small number of deaths subsequent to discharge from a hospital may have been missed because the death may have been due to a cause other than heart disease or because the name on the death certificate was different from that indicated on the hospital record. This is especially likely to occur among persons of foreign birth or extraction who Anglicize their names.

As indicated in table 1, 744, or 72.9 percent, of the 1,020 deaths from rheumatic heart disease and subacute bacterial endocarditis occurred during the initial admission in the period under study. This admission, especially during the first 2 years of the study, was not always the first admission to a hospital, since some of the patients had been admitted prior to 1930. Over a period of several years the number of deaths during the initial admission among patients previously admitted is counterbalanced to a certain extent by deaths occurring during admissions subsequent to the end of the period under study. For this reason it is believed that the figures in table 1 closely approximate the actual distribution of admissions in which death occurs. The occurrence of such a large proportion of deaths during the initial admission indicates that many patients are not hospitalized except as a last resort. Most of the other deaths were during the second and third admissions. Only 2.5 percent of deaths in hospitals occurred subsequent to the third admission. Four deaths were included among patients who were admitted prior to the end of 1934 and died early in 1935.

TABLE 1.—*Number of admissions or place of death of 1,020 fatal cases of rheumatic heart disease and subacute bacterial endocarditis admitted to Philadelphia hospitals from January 1, 1930, to December 31, 1934*

Number of admissions or place of death	All deaths from rheumatic heart disease and subacute bacterial endocarditis		Rheumatic heart disease uncomplicated by subacute bacterial endocarditis		Subacute bacterial endocarditis on rheumatic heart disease		Subacute bacterial endocarditis not on rheumatic heart disease	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Initial admission during 5-year period.....	744	72.9	495	67.6	157	85.3	92	88.5
Second admission during 5-year period.....	150	14.7	136	18.6	10	5.4	4	3.8
Third admission during 5-year period.....	43	4.3	43	5.9	0	0	0	0
Subsequent admissions during 5-year period.....	25	2.5	25	3.4	0	0	0	0
After discharge from hospital.....	54	5.3	31	4.2	16	8.7	7	6.7
Subsequent to 1934.....	4	.4	2	.3	1	.5	1	1.0
Total.....	1,020	100	732	100	184	100	104	100

Of the 916 deaths from rheumatic heart disease, including 184 from superimposed subacute bacterial endocarditis, 652, or 71.2 percent, occurred during the initial admission under study. Only 67.6 percent of 732 deaths from rheumatic heart disease uncomplicated by subacute bacterial endocarditis occurred during the initial admission under study. Of the 288 fatal cases of subacute bacterial endocarditis, only 14 were admitted more than once. This was not influenced by the relationship of subacute bacterial endocarditis to rheumatic heart disease. Somewhat more deaths from subacute bacterial endocarditis than from rheumatic heart disease occurred after discharge

from hospitals. This is only to be expected since this disease not infrequently drags on for months, sometimes with periods of temporary improvement. Patients are often removed from the hospital to save expense and for other reasons. Most of the cases admitted more than once were in the terminal stages of the disease on last admission.

DISTRIBUTION OF DEATHS BY AGE, RACE, AND SEX

ALL RHEUMATIC HEART DISEASE

The age, race, and sex distribution by 5-year age periods of 916 fatal cases of rheumatic heart disease, including 184 deaths from sub-

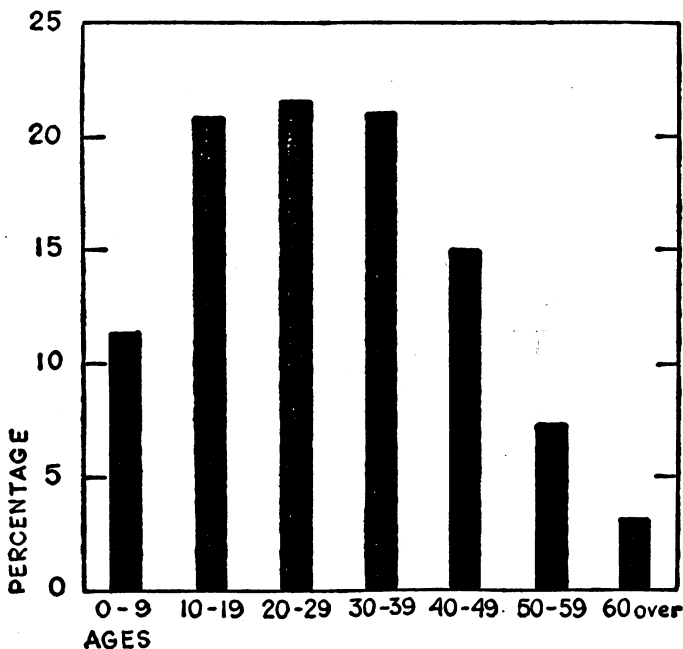


FIGURE 1.—Percentage distribution by age decades of 916 fatal cases of rheumatic heart disease, including 184 cases of subacute bacterial endocarditis superimposed on rheumatic heart disease, among admissions to Philadelphia hospitals from January 1, 1930, to December 31, 1934.

acute bacterial endocarditis superimposed on rheumatic heart disease is shown in table 2, while in figure 1 is shown the distribution of these deaths by age decades.

Mean age.—The mean age at death was 29.4 years and the median age was 28.3 years. The mean age was about the same as that determined by the writer during a study of rheumatic heart disease in Washington (D. C.) hospitals during 1932, where the mean age of 60 fatal cases was 29.0 years (2). The mean age of 357 deaths reported by physicians in Philadelphia during 1936 as due to rheumatic heart disease was 36.5 years (3). The mean age of 180 of these deaths

which occurred in hospitals approved for internship by the American Medical Association was 33.4 years. The difference between these figures is probably due to the fact that in the study made of deaths during 1936, children's and other hospitals not approved for internship were not included.

Coombs (4), in Great Britain, found that the age at death among clinical cases was 28.6 years. DeGraff and Lingg (5), in a follow-up study of 1,633 cases of rheumatic heart disease, report that the mean age at death of 644 cases was 33 years. Their series was composed largely of patients seen on an adult medical ward and adult cardiac clinic of Bellevue Hospital. This may account for the difference of about 4 years between DeGraff and Lingg's and the present series. Even at the Mayo Clinic, despite the fact that no deaths were included among persons under 10 years of age, Willius (6) states that the mean age of 160 fatal cases of rheumatic heart disease was 32 years. In round figures it seems evident that the mean age at death from rheumatic heart disease is approximately 30 years among hospital patients. The mean age is higher by several years among deaths occurring in the city as a whole or outside of hospitals.

Age distribution.—The maximum number of deaths were reported during the 20–29-year age decade, although nearly as many occurred during the 10–19- and 30–39-year age periods (fig. 1). Altogether, over 63 percent occurred during these three age decades.

TABLE 2.—Number and percentage of deaths in each 5-year age period, mean and median ages at death, according to color and sex of 916 fatal cases of rheumatic heart disease, including 184 fatal cases of subacute bacterial endocarditis superimposed on rheumatic heart disease among admissions to Philadelphia hospitals from January 1, 1930, to December 31, 1934

Age at death (years)	Total						White						Colored					
	Both sexes		Male		Female		Both sexes		Male		Female		Both sexes		Male		Female	
	Num-ber	Per-cent	Num-ber	Per-cent	Num-ber	Per-cent	Num-ber	Per-cent	Num-ber	Per-cent	Num-ber	Per-cent	Num-ber	Per-cent	Num-ber	Per-cent	Num-ber	Per-cent
Under 5.....	17	1.9	7	1.7	10	2.0	16	2.1	7	2.0	9	2.1	1	0.7	0	0	1	1.2
5-9.....	86	9.4	43	10.5	43	8.5	69	8.9	36	10.2	33	7.8	17	12.3	7	12.5	10	12.2
10-14.....	91	9.9	57	13.9	34	10.5	72	9.3	39	8.5	32	7.8	19	13.8	8	14.3	11	13.4
15-19.....	101	11.0	67	13.9	34	8.7	85	10.9	46	13.0	39	8.9	16	11.6	11	16.0	5	6.1
20-24.....	99	10.8	38	9.3	61	12.1	83	10.7	31	8.8	52	12.3	16	11.6	7	12.6	9	11.0
25-29.....	67	7.3	45	11.0	22	10.3	82	10.5	40	11.3	42	8.9	15	10.6	5	8.7	10	12.2
30-34.....	88	10.7	46	11.2	42	10.3	82	10.5	40	11.3	42	8.9	15	10.6	6	10.7	10	12.2
35-39.....	94	10.3	32	7.8	62	12.3	84	10.5	30	8.3	54	12.7	16	11.6	2	3.6	19	9.8
40-44.....	75	8.2	33	8.0	42	8.3	68	8.7	31	8.3	37	8.4	7	5.1	2	3.6	16	9.8
45-49.....	62	6.8	34	8.3	28	5.5	53	6.8	30	8.3	23	5.4	9	6.5	4	7.1	5	6.1
50-54.....	37	4.0	7	1.7	30	5.9	31	4.0	6	1.7	25	5.9	6	4.3	1	1.3	5	6.1
55-59.....	30	3.3	17	4.1	13	2.6	28	3.6	17	4.3	11	2.9	2	1.4	0	0	2	2.4
60-64.....	15	1.6	6	1.5	9	1.8	14	1.8	5	1.4	9	2.1	1	1.4	1	1.8	0	0
65-69.....	9	1.0	5	1.2	4	.9	7	.9	4	1.1	3	.7	2	.7	1	1.8	1	1.2
70 and over.....	5	.5	2	.5	3	.6	4	.5	1	.3	3	.7	1	.7	1	1.8	0	0
Total.....	916	100	410	100	506	100	778	100	354	100	424	100	138	100	56	100	82	100
Percent of total.....	.....	100	.....	44.7	.....	55.2	.....	84.9	.....	38.6	.....	46.3	.....	15.1	.....	6.1	.....	8.9
Mean age (years).....	28.4	.....	28.9	.....	28.8	.....	28.8	.....	29.3	.....	30.2	.....	27.1	.....	28.8	.....	25.9	.....
Median age (years).....	28.3	.....	27.4	.....	29.0	.....	28.9	.....	28.4	.....	29.4	.....	25.0	.....	21.4	.....	27.5	.....

The age distribution of deaths in Philadelphia hospitals indicates death at somewhat older age periods than reported by Coombs (4), who noted that nearly 31 percent occurred during the second age decade. Rheumatic heart disease may run a more rapidly fatal course in Great Britain than in this country. It is also possible that Coombs noted more deaths during adolescence in his series because he was following cases begun for the most part during childhood. Furthermore, the picture may have changed both in this country and in Great Britain since Coombs' observations were made due to earlier recognition, better treatment, attenuation of rheumatic infection, and possibly other factors. Cohn (7), Cohn and Lingg (8), Dublin and Lotka (9), Emerson (10), and the writer (11) have commented upon the reduction in heart disease mortality among young persons in the United States during the present century.

Davis and Weiss (12), contrary to the experience of the writer, noted that the peak incidence of 226 deaths caused by rheumatic heart disease, including cases of infective endocarditis superimposed on rheumatic heart disease, occurred in the 40-49-year age period. The fact that their series consisted of fatal cases occurring in only one hospital, the Boston City Hospital, instead of from all the hospitals in a large city, may explain the difference in age distribution.

Brenner (13) reported that at the Queens Hospital in Birmingham the greatest number of deaths from rheumatic heart disease occurred during the 20-29-year age period with nearly as many in the two decades from 30-49 years and a large number of deaths in the 10-19-year age period.

Race.—Over 15 percent of deaths from rheumatic heart disease in Philadelphia hospitals were among Negroes (table 2). According to the United States Census of 1930, 11.3 percent of the population of Philadelphia consists of colored persons. Owing to their less favorable economic situation, colored persons are more likely to be hospitalized than white persons. For this reason, the slightly higher percentage of deaths from this cause among Negroes than of this race in the general population does not necessarily indicate a higher mortality. On the other hand, it may be possible that Negroes do not avail themselves of hospitalization for this condition to the extent that they do for other diseases.

According to the United States Census the colored population of Philadelphia increased 69 percent during the decade 1920-29. A large proportion of these migrants were relatively healthy young adults who moved North for employment. The facts that if they had had severe heart disease they would not have left the South, and that they did not belong to the age group which is most likely to develop this disease are probably influencing factors in the mortality among this race. Studies of mortality from rheumatic heart disease

in Philadelphia during 1936 (3), mortality from heart disease especially among young persons (5, 7, 9, 14, 15), and mortality from rheumatic fever (16, 17) in the United States, suggest a much higher mortality from rheumatic heart disease among Negroes. It is not improbable that the incidence and mortality from rheumatic heart disease in Philadelphia hospitals will increase among the second and subsequent generations of Negro migrants as the causative factor becomes disseminated among persons often living under extremely unfavorable environmental conditions:

The mean age at death among white persons was 29.8 years, while among colored persons it was 27.1 years. Compared with heart disease in general, and cardiovascular syphilis, hypertensive heart disease, and acute coronary occlusion (18) in particular, the mean ages at death were more nearly the same. In most forms of heart disease the mean age at death among colored persons is lower by 8 to 10 years. Except for more male deaths during the second age decade, there were only slight differences in the age distribution. The high percentage of deaths from rheumatic heart disease among colored males aged 10 to 19 years was noted by the writer in a study of rheumatic heart disease mortality from all sources in Philadelphia during 1936 (3).

Sex.—Of the 916 fatal cases of rheumatic heart disease, 410, or 44.7 percent, were males and 506, or 55.3 percent, were females. A predominance of females was noted among both white and colored decedents. The larger number of deaths among females is in agreement with the findings of this study dealing with clinical features of rheumatic heart disease in Philadelphia hospitals and with studies of rheumatic heart mortality from all sources in Philadelphia during 1936 (3). This is consonant with the findings of a number of writers, especially Coombs (4), Brenner (13), and Findlay (19).

The mean age at death was 28.9 years among males and 29.8 years among females. There was not as much difference as reported by the writer in other series describing deaths from rheumatic heart disease (2, 3). There is not as great difference between the sexes in age at death as from heart disease in general (14), and particularly from acute coronary occlusion (18). This is probably because rheumatic heart disease is an infection, while many other types of heart disease are due to arteriosclerosis and hypertension. The age distribution (table 2) also showed very slight difference according to sex.

Coombs (4) indicated that the mean age at death was just under 30 years among males and just under 28 years among females. He believed that females are not only more likely to develop rheumatic heart disease, but that the prognosis is less favorable. In his series 37 percent of deaths among females occurred prior to 20 years of age as compared with 30 percent of the mortality among males. Con-

versely one-seventh of the males as compared with one-eighth of the females survived 40 years of age. Findlay (19) also affirmed the view that females are not only more likely to develop rheumatic heart disease, but that it occurs in more severe forms and that it tends to proceed to a fatal issue more rapidly.

Cumulative percentage of deaths by age decades.—According to figure 2, which shows the cumulative percentage of deaths from rheumatic heart disease in Philadelphia hospitals, over 10 percent occur before 10 years of age, over 30 percent by 20 years of age, over 50 percent

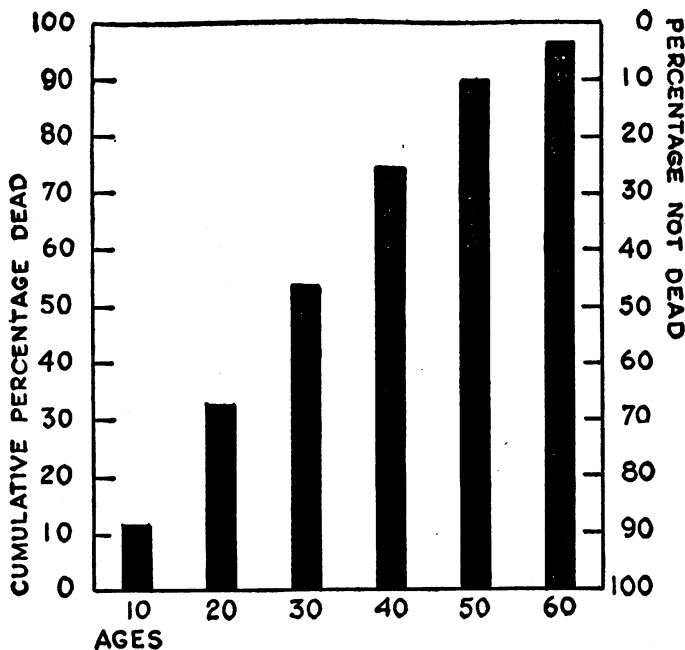


FIGURE 2.—Cumulative percentage of 916 fatal cases of rheumatic heart disease, including subacute bacterial endocarditis superimposed on rheumatic heart disease, occurring either prior to or after various ages among admissions to Philadelphia hospitals from January 1, 1930, to December 31, 1934.

by 30 years of age, nearly 75 percent by 40 years of age, nearly 90 percent prior to the fiftieth birthday, while only 3 percent occur among persons past 60 years of age. This is indicative of the importance of this disease during childhood, adolescence, and the most productive years of adult life. Unlike many forms of heart disease, practically all of the deaths from rheumatic heart disease occur before the expiration of a normal span of life.

RHEUMATIC HEART DISEASE EXCLUSIVE OF SUBACUTE BACTERIAL ENDOCARDITIS

Mean ages.—There were 732 deaths from rheumatic heart disease, exclusive of the 184 in which subacute bacterial endocarditis occurred as a complication. The mean age at death was 29.6 years, practically

the same as the mean age at death when subacute bacterial endocarditis is included (table 3). The mean ages at death and the percentage of deaths in each race and sex group were about the same as shown in table 2.

Age distribution.—On the basis of percentage age distribution by decades of life, a smaller proportion of deaths occurred in the 20–29-year age period (figure 3) than when deaths from subacute bacterial endocarditis are included (figure 1), owing to the large number of

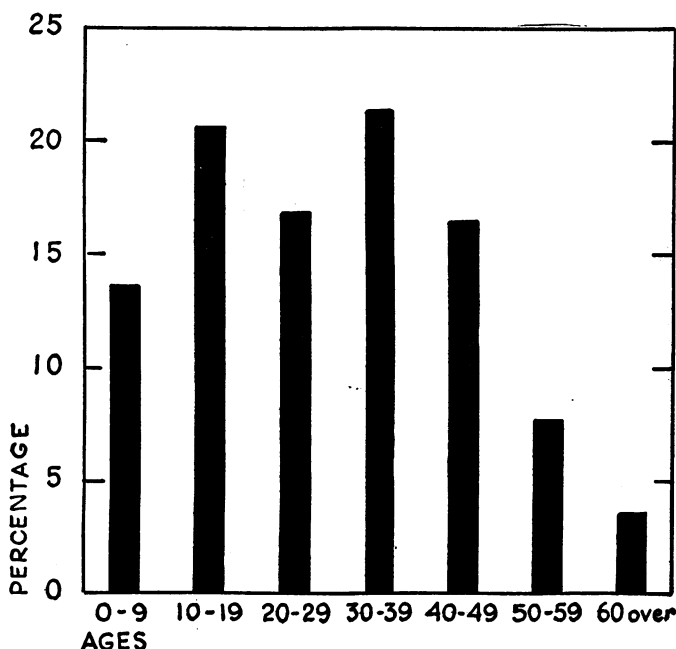


FIGURE 3.—Percentage distribution by age decades of 732 fatal cases of rheumatic heart disease, exclusive of subacute bacterial endocarditis, among admissions to Philadelphia hospitals from January 1, 1930, to December 31, 1934.

deaths from subacute bacterial endocarditis occurring in the 20–29-year age period. When deaths from this complication are excluded, the curve of deaths by decades from rheumatic heart disease assumes a double hump, with a peak in the 10–19-year age decade due to deaths primarily from rheumatic infection and in the 30–39-year age period due to the combined effects of rheumatic infection, mechanical strain from chronic valvular disease, auricular fibrillation, and the premature superimposition of arteriosclerotic changes which in a diseased heart results in death.

TABLE 3.—*Number and percentage of deaths in each 5-year period, mean and median ages at death, according to color and sex of 732 fatal cases of rheumatic heart disease, exclusive of subacute bacterial endocarditis superimposed on rheumatic heart disease, among admissions to Philadelphia hospitals from January 1, 1930, to December 31, 1934*

Age at death	Total						White						Colored					
	Both sexes			Male			Female			Both sexes			Male			Female		
	Num-ber	Per-cent	Per-cent	Num-ber	Per-cent	Per-cent	Num-ber	Per-cent	Per-cent	Num-ber	Per-cent	Per-cent	Num-ber	Per-cent	Per-cent	Num-ber	Per-cent	Per-cent
Under 5.....	15	2.0	2.2	7	2.7	2.0	8	2.5	2.5	14	2.3	2.5	7	2.1	2.1	7	0.9	1.4
5-9.....	84	11.5	12.7	41	12.7	10.5	43	12.2	12.2	67	10.9	12.2	34	9.8	9.8	33	14.5	14.1
10-14.....	80	10.9	9.9	32	9.9	11.8	48	9.4	9.4	63	10.2	9.4	26	11.1	11.1	37	13.0	14.1
15-19.....	72	9.8	13.0	42	13.0	17.4	30	9.9	9.9	61	9.9	9.9	35	7.7	7.7	26	15.2	15.5
20-24.....	59	8.1	7.1	23	7.1	8.8	35	8.1	8.1	50	8.1	8.1	19	6.5	6.5	32	7.7	8.6
25-29.....	64	8.7	9.6	31	9.6	8.1	33	8.1	8.1	50	8.1	8.1	26	7.1	7.1	34	10.9	12.7
30-34.....	75	10.2	11.4	37	11.4	9.3	38	9.3	9.3	62	10.1	9.4	32	8.9	8.9	40	10.9	11.3
35-39.....	81	11.1	7.4	24	7.4	14.0	57	7.9	7.9	71	11.5	7.9	22	10.1	10.1	49	8.5	11.3
40-44.....	62	8.5	7.1	23	7.1	9.6	39	6.1	6.1	53	9.1	6.1	22	7.9	7.9	34	4.3	8.8
45-49.....	58	7.9	10.2	33	10.2	6.1	25	4.1	4.1	49	8.0	10.7	29	5.9	5.9	20	2.2	7.0
50-54.....	29	4.0	3.9	3	3.9	6.4	26	6.4	6.4	25	4.1	10.7	23	6.8	6.8	3	3.2	5.5
55-59.....	26	3.6	4.9	16	4.9	2.5	10	2.5	2.5	24	3.9	5.8	16	2.7	2.7	8	1.9	7.0
60-64.....	14	1.9	1.5	9	1.5	2.2	5	1.5	1.5	13	2.1	1.4	4	2.7	2.7	1	2.2	4.2
65-69.....	9	1.2	1.5	5	1.5	1.0	4	1.4	1.4	7	1.1	1.4	4	2.7	2.7	2	2.2	2.8
70 and over.....	4	.5	.6	2	.6	.5	2	.5	.5	3	1.1	.4	2	2.7	2.7	2	1.7	1.4
Total.....	732	100	100	324	100	100	408	100	100	615	100	100	278	100	100	337	100	100
Percent of total.....	-----	-----	44.3	-----	-----	55.7	-----	-----	33.0	-----	84.0	-----	-----	-----	-----	-----	-----	-----
Mean age (years).....	23.6	-----	28.9	-----	23.2	-----	30.2	-----	28.7	-----	30.1	-----	-----	-----	-----	30.7	-----	27.8
Median age (years).....	23.4	-----	27.7	-----	30.9	-----	30.2	-----	28.7	-----	30.2	-----	-----	-----	-----	31.6	-----	23.1

Color and sex.—Among the deaths from rheumatic heart disease uncomplicated by subacute bacterial endocarditis, there was very little difference in the age distribution by 5-year age periods according to sex. Table 3 indicates a slightly younger age distribution and younger mean ages at death among Negroes than among white persons. As indicated above, there were only slight differences in the age distribution and mean ages according to color and sex regardless of the

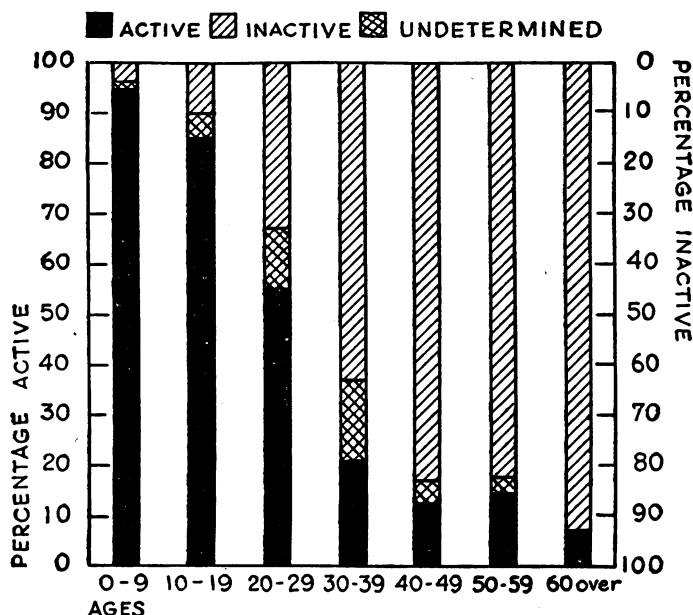


FIGURE 4.—Percentage of fatal cases in each age decade considered as due to active and inactive rheumatic heart disease, and fatal cases in which rheumatic activity was undetermined among 732 deaths from rheumatic heart disease among admissions to Philadelphia hospitals from January 1, 1930, to December 31, 1934.

relationship of subacute bacterial endocarditis to rheumatic heart disease.

Factor of rheumatic activity as a cause of death.—The factors most often responsible for death in rheumatic heart disease are rheumatic infection, and circulatory failure due to the mechanical effects of valvular heart disease. As explained in a preceding article dealing with both fatal and nonfatal cases, it is difficult to draw a hard and fast line to determine criteria of rheumatic activity, views concerning which are still in a state of flux.

In this series deaths were considered as due to active rheumatic infection when the patient had rheumatic fever or chorea during or just prior to the final admission or had signs of a systemic infection manifested by fever, leucocytosis, rapid erythrocyte rates, and other signs of infection. This was facilitated in hospitals using the American

Heart Association nomenclature, which includes an estimate of activity among its criteria for diagnosis.

Of the 732 fatal cases of rheumatic heart disease excluding subacute bacterial endocarditis, 344, or 47 percent, were considered as having signs of active rheumatic infection, 329, or 45 percent, as having inactive rheumatic heart disease, while in 57, or 8 percent, it was not possible to estimate rheumatic activity. In figure 4 is shown the age distribution of active and inactive fatal cases according to age decades. Nearly all of the deaths among persons under 10 years of age were due to active rheumatic infection. Of the 374 fatal cases of rheumatic heart disease among persons under 30 years of age, 287, or 76.7 percent, were regarded as having active rheumatic infection. After 30 years of age a considerably smaller percentage of the fatal cases was recognized as having signs of rheumatic activity.

In a measure any estimate of rheumatic activity is somewhat arbitrary. Had this study been made at the present time, especially by a clinician well versed in signs of rheumatic infection or by a well-trained pathologist, it is likely that a higher percentage of active cases would have been found, especially among persons over 30 years of age.

Necropsy studies by Rothschild, Kugel, and Gross (20) indicate the presence of signs of rheumatic activity in a large proportion of hearts of persons as old as 40 years dying of rheumatic heart disease. Bland and Jones (21) state that fully 80 percent of the fatal cases due to rheumatic heart disease which they have observed result from rheumatic fever, i. e., active rheumatic infection. Most of the fatal cases in their series were among children and young adults.

In stressing the influence of infection in causing or initiating circumstances resulting in death from rheumatic heart disease, there is a danger of unduly minimizing the mechanical effects of damaged valves and myocardium, certain cardiac arrhythmias, especially auricular fibrillation, and the influence of the superimposition of arteriosclerotic changes on previously damaged hearts. Circulatory embarrassment and deaths from these causes, without signs of rheumatic activity, are not infrequent in adult life. Embolic phenomena may result in death in inactive rheumatic heart disease. At all ages the size of the heart is probably the best single prognostic criterion.

It should also be borne in mind that only fatal cases of rheumatic heart disease, exclusive of subacute bacterial endocarditis were included. The relationship of rheumatic activity to subacute bacterial endocarditis is a moot point. It is extremely difficult to determine whether signs of systemic infection and even arthritic manifestations occurring during the course of subacute bacterial endocarditis denote rheumatic activity. Proper evaluation, even at necropsy, is often difficult.

SUBACUTE BACTERIAL ENDOCARDITIS

Mean ages.—As indicated in table 4, the mean age of deaths from all subacute bacterial endocarditis was 30.5 years. Fulton and Levine (22), reporting 111 fatal cases at the Peter Bent Brigham Hospital in Boston, found that the mean age at death was 32.2 years.

The mean age at death from subacute bacterial endocarditis superimposed on rheumatic heart disease was 28.5 years and for subacute bacterial endocarditis not engrafted on rheumatic heart disease, 33.7 years. It is possible that patients may have forgotten rheumatic episodes occurring during childhood or youth, and were consequently placed in the nonrheumatic group. This does not seem likely to any great extent since a similar difference in the mean ages at death was noted among cases in which diagnosis was confirmed at necropsy.

TABLE 4.—*Number and percentage of deaths by age decades, mean and median ages at death of 288 fatal cases of subacute bacterial endocarditis among admissions to Philadelphia hospitals from January 1, 1930, to December 31, 1934*

Age group (years)	All subacute bacterial endocarditis		Subacute bacterial endocarditis on rheumatic heart disease		Subacute bacterial endocarditis not on rheumatic heart disease	
	Number	Percent	Number	Percent	Number	Percent
Under 10.....	8	2.8	4	2.2	4	3.8
10-19.....	58	20.2	40	21.8	18	17.3
20-29.....	99	34.4	73	39.6	26	25.0
30-39.....	53	18.4	36	19.6	17	16.3
40-49.....	40	13.8	17	9.3	23	22.2
50-59.....	25	8.7	12	6.5	13	12.5
60 and over.....	5	1.7	2	1.1	3	2.9
Total.....	288	100	184	100	104	100
Mean age (years).....	30.5	-----	28.5	-----	33.7	-----
Median age (years).....	27.9	-----	26.6	-----	31.5	-----

Age distribution.—The age distribution of 288 deaths from subacute bacterial endocarditis, 184 of which were superimposed on rheumatic heart disease, while 104 were apparently not superimposed on this condition, is shown in table 4 and figure 5. The age distribution for all forms of subacute bacterial endocarditis indicates that the peak incidence, 34.4 percent, occurs during the 20-29-year age period. Few deaths occurred among persons younger than 10 years of age or older than 60 years.

The age distribution of these 288 fatal cases closely approximates the age distribution reported by a number of writers, including Horder (23), Blumer (24), Clawson (25), Thayer (26), Brenner (13), Morrison (27), and Fulton and Levine (22). With the exception of Clawson, who reported an equal number of cases during the third and fourth age decades, all noted that the highest incidence occurs during the 20-29-year age decade. All these students of this problem, with the possible exception of Thayer, observed that subacute bacterial

endocarditis is infrequent during the age period under 10 years and among persons over 60 years of age.

Considerably more deaths occurred during the 40-49-year age period from subacute bacterial endocarditis apparently not engrafted on rheumatic heart disease than from this disease occurring as a com-

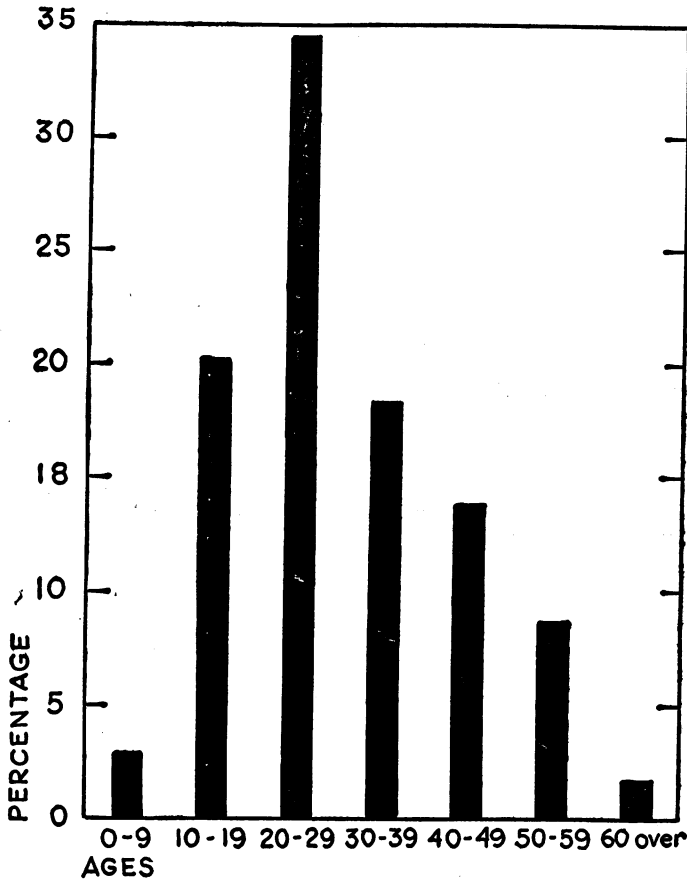


FIGURE 5.—Percentage distribution by age decades of 288 fatal cases of subacute bacterial endocarditis, including 184 cases superimposed on rheumatic heart disease and 104 apparently not superimposed on rheumatic heart disease, among admissions to Philadelphia hospitals from January 1, 1930, to December 31, 1934.

plication of rheumatic heart disease. As explained above, this also occurred in the necropsy cases and probably is not due to failure of a patient to remember rheumatic episodes.

Sex.—There were 143 deaths among males and 145 among females, an almost equal distribution. Of the 184 fatal cases of subacute bacterial endocarditis superimposed on rheumatic heart disease, 86, or 46.7 percent, were males, while 98, or 53.3 percent, were females. Among 104 deaths from subacute bacterial endocarditis in which a

relationship to rheumatic heart disease was not definitely determined, 57, or 54.8 percent, were males, and 47, or 45.2 percent, were females.

Most writers report that subacute bacterial endocarditis is considerably more common among males than females. Fulton and Levine (22) noted that over 60 percent of 111 cases seen at the Peter Bent Brigham Hospital during 1913-30 were males. Morrison (27) noted that 63.4 percent of 145 cases of subacute bacterial endocarditis at the Massachusetts General Hospital were males. Clawson (25) observed that 75 percent of 72 cases of subacute bacterial endocarditis examined post mortem were males. Thayer (26) noted that 67.8 percent of 114 cases of streptococcus (acute and subacute) endocarditis seen at the Johns Hopkins Hospital were males. Blumer (24), in a series of 328 cases, noted that 60 percent were males. Horder (23), however, noted that the number of cases among males and females was almost equally divided. Among 150 cases of infective endocarditis seen mostly at the St. Bartholomew's Hospital in London, 79 were males and 71 females. Cabot (28) reported 93 males and 87 females among 180 cases of acute and subacute bacterial endocarditis examined post mortem at the Massachusetts General Hospital during 1896-1919, an almost equal distribution. It is likely that the distribution by sex is more nearly equal than some writers have reported. In a series such as this any element of selection because of peculiarities in the composition of the patient load is minimized owing to the large number and variety of hospitals under study.

Among females, 41.4 percent of deaths occurred during the 20-29-year age period, while only 27.3 percent of deaths among males occurred in this age decade. This ratio was uninfluenced by the relationship of subacute bacterial endocarditis to rheumatic heart disease. The high incidence of deaths from subacute bacterial endocarditis among females aged 20-29 years may be due to foci of infection in the pelvic cavity.

Race.—Of the 288 deaths from subacute bacterial endocarditis, 258, or 89.6 percent, were among white persons, and 30, or 10.4 percent, were among colored persons. The ratio of white to colored fatal cases is not greatly influenced by the relationship of subacute bacterial endocarditis to rheumatic heart disease. Thayer (26) found that 90, or 78.9 percent, of 114 cases of streptococcal endocarditis at the Johns Hopkins Hospital in Baltimore were among white persons and 24, or 21.1 percent, among Negroes. It is doubtful whether race plays an important role in the etiology of subacute bacterial endocarditis. Such differences as may exist are probably due to differences in the incidence of rheumatic heart disease. This is probably more dependent on geographic locality than upon any inherent lack of susceptibility by Negroes.

NECROPSY CASES

All rheumatic heart disease.—Of the 916 deaths from rheumatic heart disease, necropsies were obtained on 214 cases, or 23.4 percent. The age distribution, mean ages at death, and race and sex distribution of necropsy cases (table 5) do not differ greatly from the entire series of 916 fatal cases of rheumatic heart disease in Philadelphia hospitals during the period under study. A somewhat younger distribution by age decades was indicated among males than females.

The mean ages at death among necropsy cases was 28.9 years. Coombs (4) in Great Britain found that the mean age at death among 98 necropsy cases was 28.2 years, a very close approximation to the mean age in this larger series of 214 deaths. The age distribution in Coombs' series differed somewhat from this series. According to Coombs, 8.1 percent occurred in the age decade under 10 years, 30.6 percent in the 10–19-year age decade, 2.4 percent in the 20–29-year age decade, 14.2 percent in the 30–39-year age decade, 13.2 percent in the 40–49-year age decade, and 9.1 percent among persons over 50 years of age. Coombs' series consisted in the main of cases of rheumatic heart disease followed from childhood, and was therefore not entirely comparable to a series consisting of all fatal cases in the hospitals of a large city during a 5-year period. It is to be expected that his series would contain more cases in which death occurred in early life. Furthermore, his series contained very few cases of rheumatic heart disease complicated by subacute bacterial endocarditis.

TABLE 5.—*Number and percentage of deaths by age decades, mean and median ages at death, according to color and sex, of 214 necropsy cases of rheumatic heart disease, including 81 of subacute bacterial endocarditis superimposed on rheumatic heart disease, among admissions to Philadelphia hospitals from January 1, 1930, to December 31, 1934*

Age group (years)	Total						White						Colored		
	Both sexes		Male		Female		Both sexes		Male		Female		Both sexes	Male	Female
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Number	Number
Under 10.....	24	11.6	11	11.1	13	12.1	19	10.9	10	11.8	9	10.1	5	1	4
10-19.....	43	20.9	28	28.3	15	14.0	35	20.1	21	24.7	14	15.7	8	2	1
20-29.....	46	22.3	20	20.2	26	24.3	37	21.3	17	20.0	20	22.5	9	3	6
30-39.....	37	18.0	18	18.2	19	17.8	34	19.5	17	20.0	17	19.1	3	1	2
40-49.....	34	16.5	14	14.1	20	18.7	28	16.1	12	14.1	16	18.0	6	2	4
50-59.....	13	6.3	3	3.0	10	9.3	12	6.9	3	3.5	9	10.1	1	0	1
60 and over.....	9	4.4	5	5.1	4	3.7	9	5.2	5	5.9	4	4.5	0	0	0
Age unknown.....	8	.....	2	.....	6	.....	5	.....	0	.....	5	.....	3	2	1
Total.....	214	100	101	100	113	100	179	100	85	100	94	100	35	16	19
Percent of total.....	100	.....	47.2	.....	52.8	.....	83.6	.....	39.7	.....	43.9	.....	16.4	7.5	8.9
Mean age (years).....	28.9	.....	27.2	.....	30.6	.....	28.1	.....	28.1	.....	31.4	.....	24.5	21.6	26.7
Median age (years).....	27.8	.....	25.3	.....	29.8	.....	28.9	.....	26.8	.....	30.8	.....	22.2	18.6	26.7

Rheumatic heart disease, exclusive of subacute bacterial endocarditis superimposed on rheumatic heart disease.—Necropsies were obtained on 133, or 18.2 percent, of 732 fatal cases of rheumatic heart disease not complicated by subacute bacterial endocarditis (table 6). The mean age at death was 28.9 years, the same as for rheumatic heart disease including subacute bacterial endocarditis when occurring as a complication (compare tables 5 and 6). The percentage distribution by race and sex were quite similar. The age distribution by decades of life closely approximates that shown in table 3 for a larger series based on 732 fatal cases. There is a greater number of males than females in the total number of fatal cases, while in the necropsy series the sex distribution is about equal. This is probably due to greater difficulty in obtaining permission for post mortem examinations on females.

Comparing tables 5 and 6, it is noted that the greatest number of necropsies among cases of uncomplicated rheumatic heart disease occurs during the 10–19-year age decade; when necropsy cases of rheumatic heart disease complicated by subacute bacterial endocarditis are included the peak incidence is in the 20–29-year age period. This is in agreement with Coombs' (4) findings mentioned above. Cabot (28), on the other hand, noted that the greatest number of cases at the Massachusetts General Hospital occurred during the 30–39-year age decade. The age distribution in Cabot's series is doubtless influenced by the predominantly adult age distribution of patients at the Massachusetts General Hospital.

TABLE 6.—*Number and percentage of deaths in each age decade, mean and median ages at death, according to color and sex, of 133 necropsy cases of rheumatic heart disease uncomplicated by subacute bacterial endocarditis among admissions to Philadelphia hospitals from January 1, 1930, to December 31, 1934*

Age group (years)	Total						White						Colored		
	Both sexes		Male		Female		Both sexes		Male		Female		Both sexes	Male	Female
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Number	Number
Under 10.....	20	16.0	8	12.7	12	19.3	16	15.2	8	14.5	8	16.0	4	0	4
10–19.....	29	23.2	21	33.3	8	12.9	23	21.9	16	29.1	7	14.0	6	5	1
20–29.....	17	13.6	9	14.3	8	12.9	12	11.4	8	14.5	4	8.0	5	1	4
30–39.....	17	13.6	9	14.3	8	12.9	17	16.2	9	16.4	8	16.0	0	0	0
40–49.....	28	22.4	11	17.5	17	27.4	23	21.9	9	16.4	14	28.0	5	2	3
50–59.....	7	5.6	0	0	7	11.3	7	6.7	0	0	7	14.0	0	0	0
60 and over.....	7	5.6	5	7.9	2	3.2	7	6.7	5	9.1	2	4.0	0	0	0
Age unknown.....	8	—	2	—	6	—	5	—	0	—	5	—	3	2	1
Total.....	133	100	65	100	68	100	110	100	55	100	55	100	23	10	13
Percent of total.....	100	—	48.9	—	51.1	—	82.7	—	41.3	—	41.3	—	17.3	7.5	9.8
Mean age (years).....	28.9	—	27.0	—	30.9	—	30.1	—	27.5	—	33.0	—	22.5	23.3	22.0
Median age (years).....	27.9	—	22.8	—	33.8	—	30.9	—	24.4	—	37.5	—	20.0	18.0	22.5

Subacute bacterial endocarditis.—Necropsies were obtained on 118, or 41.0 percent, of 288 fatal cases of subacute bacterial endocarditis. The mean age at death was 31.4 years (table 7). The mean age and age distribution by decades of life are not unlike those shown in table

4 and figure 5, based on all 288 fatal cases of subacute bacterial endocarditis. In both of these tables the peak incidence is in the 20-29-year age decade. The mean age at death was 29.2 years among 81 fatal cases of subacute bacterial endocarditis superimposed on rheumatic heart disease, while it was 37.5 years among 37 necropsy cases in which a relationship to rheumatic heart disease was not evident. Laws and Levine (29), in a series of 43 cases of rheumatic heart disease dying of subacute bacterial endocarditis, found that the mean age at death was 38.2 years.

TABLE 7.—*Number and percentage of deaths in each age decade, mean and median ages at death of 118 necropsy cases of subacute bacterial endocarditis, among admissions to Philadelphia hospitals from January 1, 1930, to December 31, 1934*

Age group (years)	All subacute bacterial endocarditis		Subacute bacterial endocarditis on rheumatic heart disease		Subacute bacterial endocarditis not on rheumatic heart disease	
	Number	Percent	Number	Percent	Number	Percent
Under 10.....	7	5.9	4	4.9	3	8.1
10-19.....	18	15.2	14	17.3	4	10.8
20-29.....	37	31.4	29	35.8	8	21.6
30-39.....	25	21.2	20	24.7	5	13.5
40-49.....	13	11.0	5	6.2	8	21.6
50-59.....	15	12.7	7	8.6	8	21.6
60 and over.....	3	2.5	2	2.5	1	2.7
Total.....	118	100	81	100	37	100
Mean age (years).....	31.4		29.2		37.5	
Median age (years).....	29.2		27.8		37.0	

On the basis of necropsy studies, 68.6 percent of the cases of subacute bacterial endocarditis appeared to have a definite rheumatic background.

COUNTRY OF BIRTH

Death certificates were obtained on 859 fatal cases of rheumatic heart disease, including 184 cases in which subacute bacterial endocarditis occurred as a complication of rheumatic heart disease. Of these 859 deaths, 127 were among colored persons, practically all of whom presumably were born in the United States. The countries of birth of 732 fatal cases of rheumatic heart disease among white persons were:

	Number	Percent
United States.....	583	79.6
Russia.....	44	6.1
Italy.....	28	3.8
Ireland.....	12	1.6
Poland.....	11	1.5
Austria-Hungary.....	11	1.5
England, Scotland, and Wales.....	8	1.1
Germany.....	6	0.8
Other countries.....	24	3.3
Unknown.....	5	0.7
	732	100.0

Definite conclusions cannot be drawn concerning the influence of nationality on a disease in which the mean age at death is less than 30 years of age, especially in view of the marked reduction in immigration during recent years. There has been comparatively little immigration from some of these countries, such as Germany, since the World War of 1914-18. The writer (18) recently invited attention to the influence of immigration on deaths from acute coronary occlusion. Mortality from that disease tended to be higher among persons born in countries with the greatest immigration prior to 1900. In rheumatic heart disease the converse prevails.

For a more detailed consideration of immigration, reference is made to the United States Census of 1930 (30). Thompson and Britten (31) have also pointed out that among foreign born persons age varies a great deal with country of birth by reason of the fact that English, German, Irish, and northern European immigrants to the United States came much earlier than the Italian, Polish, and eastern and southern European immigrants. This may account in a large measure for the relatively large number of deaths from rheumatic heart disease among persons born in Italy and Russia, countries from which there has been the greatest immigration since the World War of 1914-18.

DEATHS ACCORDING TO RACIAL STRAINS

Racial strains of 732 white persons who died from rheumatic heart disease were determined. Decedents were considered as of old American stock only when both parents were native born. When one or both parents were foreign born the decedent was considered of foreign strain. Where both parents were foreign born but of different nationalities the racial strain was based arbitrarily on the nationality of the father. From these data mean annual specific rates of deaths in hospitals were computed, based on the United States Census of 1930 (table 8).

According to table 8 the death rate in hospitals is higher among white persons of old American stock than among any of the racial strains of foreign extraction. Decedents of Russian, Italian, and Austro-Hungarian racial strains occupy an intermediary position, while the lowest mortality from rheumatic heart disease in hospitals was noted among persons of British, Irish, Polish, and German birth or extraction.

The period of the greatest influx of immigration also influences this group, but to a less extent than among deaths of persons born in foreign countries. Most of the foreign strain decedents in table 8 belonged to the second generation following immigration. Proximity to hospitals and the relative readiness with which various racial groups avail themselves of hospital facilities also play a part.

TABLE 8.—*Specific death rates per 100,000 population from rheumatic heart disease of 732 fatal cases among white persons admitted to Philadelphia hospitals from January 1, 1930, to December 31, 1934, based on racial strains. When the decedent or one parent was foreign born, the decedent was considered of a foreign strain. When both parents were foreign born, but of different nationalities, the decedent was arbitrarily considered as belonging to national strain of father. Based on information obtained from death certificates*

Country	Persons of various racial strains residing in Philadelphia according to U. S. Census of 1930	Deaths from rheumatic heart disease	Mean annual rate per 100,000 population
United States.....	371,974	263	14.1
Russia.....	176,088	89	10.1
Germany.....	131,323	32	4.9
Ireland.....	184,356	73	7.9
Italy.....	182,368	93	10.2
England, Scotland, and Wales.....	98,757	36	7.3
Austria-Hungary.....	40,241	22	10.9
Poland.....	77,994	21	5.4
Unknown.....		69	
Other countries.....		34	
Total.....		732	

The low incidence of deaths from rheumatic heart disease among persons of German birth or extraction is probably due to a better economic status than that of most persons of foreign birth or extraction. Most of the immigration from Germany occurred prior to the World War of 1914-18 and as a consequence they have become better established economically. As a result, they are more likely to be attended by private physicians than admitted to the wards of general and children's hospitals. Similarly it is quite likely that a lower incidence of rheumatic conditions actually obtains, since rheumatic fever is more prone to attack persons in the lower economic brackets.

OCCUPATION OF DECEDENTS

Review of 860 death certificates of fatal cases of rheumatic heart disease, including subacute bacterial endocarditis superimposed on rheumatic heart disease, indicated that over 25 percent of the decedents belonged to the preschool or school groups (table 9). Of the 331 white males only 10, or 3.0 percent, belonged to the professional class. Among white males, 125, or 50.6 percent, of the 247 decedents not in the preschool or school groups were listed as skilled, semiskilled, or unskilled laborers. This is probably an underestimate, since many persons whose occupational status was listed as unknown, retired, or unemployed belonged in the laboring classes. While these findings are by no means conclusive, they give additional support to the widely accepted view that rheumatic heart disease is essentially a disease of the wage-earning class.

TABLE 9.—Number of decedents in each occupational group by color and sex among 860 fatal cases of rheumatic heart disease, including subacute bacterial endocarditis superimposed on rheumatic heart disease, in Philadelphia hospitals from January 1, 1930, to December 31, 1934, based on information from death certificates

Occupational group	Total						White						Colored		
	Both sexes		Male		Female		Both sexes		Male		Female		Both sexes, number	Male, number	Female, number
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent			
Preschool.....	31	3.6	13	3.4	18	3.8	28	3.8	13	3.9	15	3.7	3	0	3
School.....	196	22.8	93	24.3	103	21.6	155	21.1	71	21.4	84	20.9	41	22	19
Housewife—home.....	227	27.5	0	0	237	49.7	202	27.6	0	0	202	50.2	35	0	35
Professional.....	21	2.4	11	2.9	10	2.1	20	2.7	10	3.0	10	2.5	1	1	0
Merchant.....	21	2.4	20	5.2	1	.2	21	2.9	20	6.0	1	.2	0	0	0
Clerks-salesmen.....	44	5.1	36	9.4	8	1.7	44	6.0	36	10.9	8	2.0	0	0	0
Skilled labor.....	101	11.7	88	23.0	13	2.7	97	13.2	85	25.7	12	3.0	4	3	1
Semiskilled and unskilled labor.....	87	10.2	58	15.1	29	6.1	57	7.8	40	12.1	17	4.2	30	18	12
Farmers.....	4	.5	4	1.0	0	0	3	.4	3	.9	0	0	1	1	0
Occupation unknown.....	65	7.6	34	8.9	31	6.5	56	7.6	30	9.1	26	6.5	9	4	5
No occupation, retired, unemployed.....	53	6.2	26	6.8	27	5.7	50	6.8	23	6.9	27	6.7	3	3	0
Total.....	860	100	383	100	477	100	733	100	331	100	402	100	127	52	75

The relationship of occupation to rheumatic heart disease is difficult to interpret. Since this disease for the most part dates back to childhood or adolescence, its victims are often restricted from engaging in arduous occupations. To a certain extent they are more likely to pursue professional or clerical occupations. Consequently, because of this factor of selection, there are probably more persons with rheumatic heart disease engaged in sedentary occupations than their social status would normally indicate.

YEARLY DISTRIBUTION OF DEATHS

The number of deaths showed considerable increase during the first three years of the study (table 10), probably owing to better recognition. During 1932–34 the number of deaths from rheumatic heart disease, including subacute bacterial endocarditis superimposed on rheumatic heart disease, and the percentage of fatal cases among hospital admissions from all causes remained fairly constant. Based on these figures there are about 200 deaths each year in Philadelphia hospitals due to rheumatic heart disease. Of these 200 deaths, about 165 are due primarily to rheumatic heart disease and 35 to subacute bacterial endocarditis superimposed on rheumatic heart disease. About 0.10 percent of admissions from all causes to Philadelphia hospitals succumb to rheumatic heart disease.

TABLE 10.—*Distribution by years under study of 916 fatal cases of rheumatic heart disease, including subacute bacterial endocarditis superimposed on rheumatic heart disease, among admissions to Philadelphia hospitals from January 1, 1930, to December 31, 1934*

Year	Number of deaths	Percentage of deaths each year	Admissions from all causes	Percentage of fatal cases among admissions from all causes
1930.....	138	15.1	176,521	0.078
1931.....	154	16.8	169,045	.091
1932.....	199	21.7	169,803	.117
1933.....	194	21.2	172,121	.113
1934.....	214	23.3	162,993	.131
1935.....	3	.3		
Unknown.....	14	1.5		
Total.....	916	100.0	850,423	.108

HISTORY OF RHEUMATIC INFECTION

Definite histories of previous rheumatic infection or an indication of rheumatic fever or chorea during final admission were noted in 606, or 66.2 percent, of 916 fatal cases of rheumatic heart disease, including the cases with subacute bacterial endocarditis as a complication of rheumatic heart disease. Only histories of rheumatic fever, chorea, or both of these conditions were considered sufficiently definite to indicate previous rheumatic infection. Histories of other conditions which sometimes seem to result in rheumatic heart disease, such as growing pains or tonsillitis, were not included. Among these 916 fatal cases, a history of rheumatic fever alone was obtained in 526, or 57.4 percent. Histories of both rheumatic fever and chorea were obtained in 28 fatal cases, or 3.1 percent. Altogether a history of rheumatic fever was indicated in 554, or 60.5 percent.

A history of Sydenham's chorea without rheumatic fever was obtained in 67, or 7.3 percent. Including the 28 cases in which a history of both rheumatic fever and chorea was mentioned, chorea was indicated in 95 instances, or 10.4 percent. The high incidence of chorea without rheumatic fever according to these histories is probably due in no small measure to a failure of patients to remember evanescent rheumatic episodes occurring during childhood, while a history of chorea is usually indelibly fixed in a patient's memory. This should not be interpreted as an attempt to deprecate the importance of chorea as a rheumatic episode. Next to rheumatic fever, it is the most frequent clinical entity encountered with rheumatic carditis. The association of this triad of diseases occurs with too great frequency to be dismissed casually. In this series a history of Sydenham's chorea without rheumatic fever occurred about one-eighth as frequently as rheumatic fever. Including instances in which there was a history of chorea and rheumatic fever, chorea occurred about one-fifth as frequently as rheumatic fever in the histories of these fatal cases.

AGE OF ONSET OF RHEUMATIC INFECTION

According to table 11, the onset of rheumatic infection occurred before 20 years of age in 78.1 percent and before 30 years of age in 91.2 percent of 542 fatal cases in which the age at onset was indicated in the clinical histories. This is probably an underestimate of the onset of rheumatic infection prior to these ages. Since rheumatic fever in childhood is often not attended by severe joint manifestations, the first episode may have been forgotten. Furthermore, 64 patients gave a history of rheumatic infections but did not state the exact age. Most of these were either relatively young or middle-aged persons who stated that the disease occurred "during childhood," the clear implication being that it developed prior to 20 years of age.

Reference is made to Part II of this series of articles, dealing with clinical manifestations of rheumatic heart disease in Philadelphia hospitals. The distribution of age at onset of rheumatic infection as obtained from the clinical histories of fatal cases of rheumatic heart disease follows the same general pattern as the age at onset of rheumatic fever among all cases of rheumatic heart disease.

TABLE 11.—*Number and percentage distribution by 5-year age periods of onset of rheumatic infection among 606 fatal cases with definite history of rheumatic fever or chorea among 916 fatal cases of rheumatic heart disease, including subacute bacterial endocarditis as a complicating factor, among admissions to Philadelphia hospitals from January 1, 1930, to December 31, 1934*

Age period (years)	Number	Percent	Cumulative percentage	Age period (years)	Number	Percent	Cumulative percentage
Under 5.....	26	4.8	4.8	35-39.....	14	2.6	97.3
5-9.....	158	29.2	34.0	40-44.....	12	2.2	99.5
10-14.....	148	27.3	61.3	45-49.....	1	.2	99.7
15-19.....	91	16.8	78.1	50 and over.....	2	.4	100.0
20-24.....	38	7.0	85.1	Age unknown.....	64	-----	-----
25-29.....	33	6.1	91.2	Total.....	606	100	-----
30-34.....	19	3.5	94.7				

NOTE.—Mean age at onset 14.7 years; mode, 9.3 years.

Age at onset of rheumatic infection in this series is somewhat younger than reported at the Mayo Clinic. Willius (6) in a series of 160 fatal cases, none of which were less than 10 years of age at death, noted that the first attack of rheumatic infection occurred before 20 years of age in 64 percent of cases and before 30 years of age in 85 percent of cases. The peak incidence of the onset of rheumatic infection, according to histories at the Mayo Clinic, occurred in the 10-19-year age period, during which 46 percent developed. The differences in these series, which are not great, are probably explained on the basis of the selected clientele of the Mayo Clinic.

Davis and Weiss (33) in a series of 113 fatal cases at the Boston City Hospital obtained histories of onset of rheumatic fever in the 0-10-year age period in 27.4 percent, in the 11-20-year age group in

40.8 percent, in the 21-30-year age group in 14.1 percent, in the 31-40-year age group in 12.4 percent, and among persons over 40 years of age in 5.3 percent. This age distribution of onset of rheumatic infection, while indicating an onset among somewhat older persons, is not dissimilar to the age distribution in table 11.

In a series of 1,633 fatal cases of rheumatic heart disease, DeGraff and Lingg (5) found that the greatest incidence of initial rheumatic infections, 39.6 percent, occurred during the 10-19-year age decade. Infection occurred before 30 years of age in 84.7 percent, and in 95.6 percent by 40 years of age. Taking into consideration certain deaths from rheumatic heart disease occurring among persons of an age not included in their series, these writers place the mean age at onset at 16.8 years, the median age at onset at 14 years and the mode at 9-11 years, closer to that of 8 years as reported by Wilson, Lingg, and Croxford (32).

INTERVAL BETWEEN RHEUMATIC INFECTION AND DEATH

The mean age at onset of rheumatic infection according to the clinical histories of these 606 cases was 14.7 years. The mean age at death was 28.1 years. On this basis, the average interval between onset of rheumatic infection and death is 13.4 years. Willius (6) noted that the mean duration of rheumatic heart disease among 160 fatal cases at the Mayo Clinic was 14 years. DeGraff and Lingg (5) place the mean duration of rheumatic heart disease at 15 years.

The interval between the onset of rheumatic infection, according to the clinical history, and the age at death according to age decades is shown in table 12. On the basis of clinical histories, 73, or 13.5 percent of cases giving age at onset, succumbed within 1 year after the onset of rheumatic fever or chorea. Nearly 32 percent of deaths occurred in less than 5 years after the onset of rheumatic infection and over 48 percent in less than 10 years. On the other hand, nearly 11 percent survived 30 years from the onset of rheumatic infection.

TABLE 12.—Interval between age at onset of rheumatic infections as indicated in the clinical history and age at death according to age decades among 606 fatal cases of rheumatic heart disease admitted to Philadelphia hospitals from January 1, 1930, to December 31, 1934

Duration (years)	Deaths at all ages		Age decade at death (years)						
	Num-ber	Per-cent	Under 10	10-19	20-29	30-39	40-49	50-59	60 and over
Less than 1 year	73	13.5	37	19	9	4	4		
1	24	4.4	5	10	3	4	1	1	
2	21	3.9	12	6	2	1			
3	32	5.9	4	17	4	5	2		
4	22	4.1	2	11	7	1	1		
5	19	3.5	1	9	5	4			
6	19	3.5	1	8	5	2	3		
7	24	4.4	1	12	4	4	2	1	
8	13	2.4		6	5	2			
9	15	2.8		7	6			2	
10-14	81	14.9		17	40	15	7	2	
15-19	70	12.9		3	33	23	8	3	
20-24	33	6.1			3	16	9	5	
25-29	37	6.8				22	12	2	1
30 and over	59	10.9				3	31	16	9
Age at onset unknown	64		3	11	15	10	13	7	5
Total	606	100	66	136	141	116	93	39	15
Percent of total		100	10.9	22.4	23.3	19.1	15.3	6.4	2.5

These figures agree quite closely with those of Davis and Weiss (33), who noted that 30.1 percent of 83 necropsy cases died within 5 years after the onset of rheumatic fever and 42.1 percent within 10 years. These statistics should not be interpreted as indicating the duration of life following attacks of rheumatic fever or chorea, but rather that a large proportion of deaths from rheumatic heart disease occur within a few years after the onset of rheumatic infection. The figures in table 12 do not present as unfavorable a prognosis as those of some other writers seem to indicate. Bland and Jones (21) found that nearly half (47 percent) of the deaths occurred after durations of less than 3 years and that nearly two-thirds (62 percent) occurred within 5 years. Ash (34) found that 40.5 percent of 121 children with rheumatic infection were dead within 10 years after the onset. Both of these series were limited exclusively to cases developing in childhood and adolescence.

DEATH DURING FIRST ATTACK OF RHEUMATIC FEVER

During the 5 years under study 862 patients were admitted during a first attack of rheumatic fever. According to table 13, 30 cases, or 3.5 percent, terminated fatally. In addition, there were 9 other fatal cases in which no mention was made in the clinical record of a previous attack. On this basis, 39 patients, or 4.5 percent, succumbed during a first attack of rheumatic fever. Of the 283 first attacks of rheumatic fever during the age decade under 10 years, 7.1 percent resulted fatally. During the 10-19-year age decade 2.3 per-

cent of 306 patients admitted during a first attack died. Among the older age groups smaller percentages of case fatalities obtained.

There were only 4 fatalities during first attacks of chorea; of these 2 were diagnosed as also having rheumatic fever. In 3 other fatal cases of chorea no previous attack was indicated.

TABLE 13.—*Number and percentages of deaths during first attack of rheumatic fever by age decades in Philadelphia hospitals from January 1, 1930, to December 31, 1934*

Age decade (years)	First attacks	Deaths during first attacks		Age decade (years)	First attacks	Deaths during first attacks	
	Number	Number	Percent		Number	Number	Percent
Under 10.....	283	20	7.1	40 and over.....	42	1	2.4
10-19.....	306	7	2.3	Age unknown.....	3	0	0
20-29.....	147	1	.7	Total.....	862	30	3.5
30-39.....	81	1	1.2				

In addition to these, there were 19 patients, 14 in the age period under 10 years and 5 in the 10-19-year age period who died during a first attack of fulminating rheumatic carditis. These patients gave neither histories nor signs of rheumatic fever or chorea during their stay in the hospital. If these are included, the initial case fatality rate is somewhat higher. It was not considered advisable to attempt to determine the number of instances of initial rheumatic infections, since many patients with well-developed rheumatic heart disease have no histories of previous rheumatic infection.

Atwater (17) in a composite series of 21,608 cases of rheumatic fever collected from 9 sources noted that the case fatality rate was 1.74 percent. Since this figure was based on cases reported in the literature prior to 1900 and for the most part by European writers, it is doubtful whether this percentage would apply in the United States at the present time. Swift (35) places the case fatality rate at 4 percent. Ash (36), in Philadelphia, recently noted that 5.2 percent of 521 patients died during an initial attack of rheumatic infection. Her series was confined exclusively to patients at the Children's Hospital. In the present series 4.6 percent of 582 patients under 20 years of age admitted during a first attack of rheumatic fever died (table 13). This is in substantial agreement with Ash. The slight difference is probably due to a larger number of cases in this series with onset in the 10-19-year age period.

MISCELLANEOUS DATA

Nonresident deaths.—Review of 860 death certificates indicated that 750, or 87.2 percent, of the decedents from rheumatic heart disease including subacute bacterial endocarditis were residents of Philadelphia, while 80, or 9.3 percent, were nonresidents. The residence of

30, or 3.5 percent, was not listed on the death certificates. Despite the preeminence of Philadelphia as a medical center, rheumatic heart disease is distinctly a local problem. To a slight extent this is due to the inclusion of deaths from rheumatic heart disease complicated by subacute bacterial endocarditis, since of 685 deaths from rheumatic heart disease without this complication only 8.3 percent were non-residents. Of the 275 deaths from subacute bacterial endocarditis for which death certificates were found, 37, or 13.4 percent, were nonresidents. This was uninfluenced by the relationship of subacute bacterial endocarditis to rheumatic heart disease.

Coroner's cases.—Among 860 death certificates filed at the local office of vital statistics of the State Department of Health and describing deaths from rheumatic heart disease, including subacute bacterial endocarditis as a complicating factor, in Philadelphia hospitals from January 1, 1930, to December 31, 1934, 68, or 7.9 percent, indicated that the deaths had been investigated by the coroner's office because the patient was admitted to hospital for a period of less than 24 hours before death. Excluding 175 deaths from subacute bacterial endocarditis apparently superimposed on rheumatic heart disease, 63, or 9.2 percent, of 685 deaths from rheumatic heart disease were the subject of a coroner's inquest. The mean age of these deaths was 29.4 years, approximately the same as that of all deaths from rheumatic heart disease in Philadelphia hospitals.

It is noteworthy that such a relatively high percentage of deaths from this essentially chronic disease occur suddenly or are unattended by a physician. This suggests that there are other types of heart disease than acute coronary occlusion and cardiovascular syphilis of interest to students of forensic medicine.

Only 11, or 4.0 percent, of 276 cases of subacute bacterial endocarditis were investigated by the coroner's office. Sudden deaths due to this condition are not uncommon, but the cause is usually so obvious that a coroner's investigation is not deemed necessary. Since this disease is generally characterized by a wasting illness, comparatively few patients are admitted to hospital just prior to death.

Deaths among Jewish persons.—Based on information from hospital records and death certificates, 120 deaths from rheumatic heart disease including subacute bacterial endocarditis were indicated among Jewish persons. According to the United States Census of 1930 there were 270,000 Jews in Philadelphia. On this basis, the mean annual death rate among Jewish persons in Philadelphia hospitals during the 5-year period was 8.3 per 100,000 Jewish population. The mean annual death rate among white gentiles was 7.9 per 100,000 population, suggesting very little difference. Of the 120 deaths, 54, or 45 percent, were males, and 66, or 55 percent, were females. The mean age at

death was 28.7 years. The age distribution was similar to that of the fatal cases as a whole.

Deaths during pregnancy.—Twenty-one cases of rheumatic heart disease terminated fatally during pregnancy. Of this number, 4 died primarily as a result of complications of pregnancy, 1 died of diabetes mellitus, while 16 died of rheumatic heart disease aggravated in most instances by the pregnant state. Of the deaths attributable to rheumatic heart disease, 9 followed Caesarean sections, 2 followed therapeutic abortions, 3 occurred during childbirth, and 2 followed congestive heart failure during the early months of pregnancy. Of the 4 deaths directly attributable to pregnancy 1 was due to puerperal sepsis, 2 to postpartum hemorrhage, and 1 to extrauterine pregnancy. Altogether 21, or 18.1 percent, of 116 pregnant women with rheumatic heart disease died.

This incidence of fatalities from rheumatic heart disease is considerably higher than generally indicated at the present time. Carr and Hamilton (37) report that with careful antenatal supervision the mortality among pregnant women with serious heart disease at the Boston Lying In Hospital has been reduced from 12 percent to 3 percent in a period of 15 years. The wide discrepancy can largely be explained because of difference in antenatal care. Most of the patients in this series who died were admitted in a serious condition and with little or no previous supervision.

Another explanation is that owing to imperfect cross-indexing of hospital records some cases which survived pregnancy were probably not included in this series. This would result in an erroneously high incidence of mortality from heart disease during pregnancy. As indicated in Part I of this study, the recording and filing of case records describing heart disease was less satisfactory in maternity hospitals and departments than in other places.

SUMMARY

Of the 5,921 admissions involving rheumatic heart disease, rheumatic fever, Sydenham's chorea, and subacute bacterial endocarditis to Philadelphia hospitals from January 1, 1930, to December 31, 1934, 1,020, or 17.2 percent, are known to have terminated fatally during the period under study or during an admission begun prior to January 1, 1935. Excluding subacute bacterial endocarditis apparently not superimposed on rheumatic heart disease, death occurred in 916, or 15.8 percent, of 5,801 admissions for rheumatic conditions. Of 4,653 cases, in contradistinction to admissions, of rheumatic conditions and subacute bacterial endocarditis, 1,020, or 21.9 percent, died. Excluding subacute bacterial endocarditis apparently not superimposed on rheumatic heart disease, 916, or 20.2 percent, of 4,538 cases resulted fatally.

Of the 916 fatal cases of rheumatic heart disease, 94.0 percent were admitted primarily for rheumatic conditions or subacute bacterial endocarditis superimposed on rheumatic heart disease.

The cause of death of only 1.6 percent of 916 fatal clinical cases of rheumatic heart disease appeared to be attributable directly to causes other than rheumatic heart disease or subacute bacterial endocarditis as a complication. Had this study been made on the basis of post-mortem examinations rather than clinical cases of rheumatic heart disease, this percentage in all likelihood would have been substantially increased.

With one possible exception the cause of 916 deaths involving rheumatic conditions, including subacute bacterial endocarditis as a complicating factor, was rheumatic heart disease. In no instance was death attributable to the arthritic manifestations of rheumatic fever or the cerebral manifestations of Sydenham's chorea.

Most deaths from rheumatic heart disease among patients who have been hospitalized occur in hospitals; almost three-fourths of the fatal cases are admitted only once.

The mean age at death from rheumatic heart disease, regardless of its association with subacute bacterial endocarditis, in both clinical and necropsy series is slightly less than 30 years. A slightly greater proportion of deaths is indicated among females than among males. Taking into consideration the less favorable economic circumstances of Negroes, the proportion of deaths from rheumatic heart disease in hospitals among members of this race was not as great as might be expected. This is probably influenced by the age distribution of the Negro population as a result of migration in recent years. The mean ages and age distributions do not suggest as great differences on the basis of race and sex as encountered in certain other types of heart disease.

Among 916 deaths from rheumatic heart disease, including subacute bacterial endocarditis as a complication, the greatest number occurred during the 20-29-year age period, with nearly as many in the 10-19- and 30-39-year age periods. Over 63 percent occurred during these 3 age decades.

Over 50 percent of deaths from rheumatic heart disease occurred among persons less than 30 years of age, while only 3 percent occurred among persons over 60 years of age. Unlike many forms of heart disease, practically all deaths from rheumatic heart disease occur before the expiration of a normal span of life.

The age distribution of 732 deaths from rheumatic heart disease, exclusive of subacute bacterial endocarditis as a complication, manifested a double humped curve with peaks in the 10-19- and 30-39-year age decades.

Over 75 percent of the deaths from rheumatic heart disease among persons under 30 years of age were apparently due to active rheumatic infection. Rheumatic infection is almost invariably the cause of death in children and young persons. With advancing age it becomes a less significant factor.

The peak of deaths from subacute bacterial endocarditis, regardless of its relationship to rheumatic heart disease, occurred during the 20-29-year age decade. The distribution by age decades and mean ages at death indicated death at ages younger by several years from subacute bacterial endocarditis superimposed on rheumatic heart disease than from other forms of subacute bacterial endocarditis.

These studies do not suggest that deaths from rheumatic heart disease in Philadelphia hospitals are more common among persons foreign born or of foreign extraction than among old-stock white Americans; if anything, the opposite obtains. This is probably influenced by the readiness with which various racial groups avail themselves of hospital facilities, their economic status, and the relative age of foreign groups, which is dependent in no small measure on the period of greatest immigration.

From the distribution of deaths by socioeconomic groups it is inferred that fatalities from rheumatic heart disease are disproportionately high among the laboring classes. Few deaths were indicated among professional men. In rheumatic heart disease choice of occupation is often limited because the disease develops during childhood; as a result persons with rheumatic heart disease are not as likely to engage in occupations requiring strenuous exertion as their social status would otherwise suggest.

Rheumatic heart disease results in approximately 200 deaths in Philadelphia hospitals annually; 165 are due primarily to rheumatic heart disease, while 35 are due to subacute bacterial endocarditis superimposed on rheumatic heart disease. In about 0.10 percent of admissions from all causes, death is due to rheumatic heart disease.

Definite histories of rheumatic fever, Sydenham's chorea, or both of these conditions were obtained in 66.2 percent of fatal cases. In nearly 80 percent of instances in which the age at onset was given, the primary rheumatic manifestation developed prior to age 20 years; in less than 3 percent was onset indicated among persons past 40 years of age.

The mean age at onset was 14.7 years, the mode, 9.3 years. The mean interval between the primary rheumatic manifestation and death was 13.4 years. Among 542 fatal cases in which the duration was ascertained, death resulted in less than 1 year in 13.5 percent, in less than 5 years in nearly 32 percent, and in less than 10 years from the onset of the primary rheumatic manifestation in over 48 percent.

At least 3.5 to 4.5 percent of first attacks of rheumatic fever terminated fatally. If deaths from fulminating rheumatic carditis without arthritic manifestations of rheumatic fever are included, the percentage of initial case fatalities becomes even higher.

Despite the preeminence of Philadelphia as a medical center, mortality from rheumatic heart disease among hospital patients constitutes a distinctly local problem; at least 87.2 percent of fatal cases were residents.

Nearly 8 percent of deaths from rheumatic heart disease required investigation by the coroner's office because of their suddenness or because the patient had been unattended by a physician. To this extent rheumatic heart disease is a problem of interest to students of forensic medicine. Only 4.0 percent of deaths from subacute bacterial endocarditis were the subject of a coroner's investigation.

The mean annual death rate from rheumatic heart disease in hospitals among Jewish persons was approximately the same as among white gentiles.

Twenty-one deaths among hospital patients with rheumatic disease occurred during pregnancy and the puerperium; 16 were directly attributable to rheumatic heart disease. Of 116 pregnant women with rheumatic heart disease, 18.1 percent died. This high percentage is probably due to the severity of their condition on admission and to the likelihood that some cases of rheumatic heart disease which survived pregnancy were not identified for study because of obsolete filing systems and diagnostic nomenclature in some maternity hospitals.

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POPULATION TRENDS IN STATES AND CITIES AS SHOWN BY PRELIMINARY 1940 CENSUS FIGURES

From time to time the Bureau of the Census is issuing preliminary figures of the 1940 population census for States and for cities of 25,000 population or more. While these figures are based on counts made by the local supervisors, and may be changed somewhat when the final count is checked by the Census Bureau, the changes and trends so far indicated by the preliminary figures are of interest.

For 25 States for which preliminary figures have been announced, the aggregate 1940 population is 43,786,591, as compared with 41,640,821 in 1930 and 37,493,403 in 1920. These figures represent an increase of 5.2 percent in the 1930-40 decennium as compared with an increase of 11.1 percent for the earlier period. The percentage increase for the current census period will probably be much larger when the data for all States are available. The present list includes many of the agricultural and less populous States, whereas preliminary figures are not yet available for the more highly industrialized States, those with the largest populations, and those to which large migrant populations have been attracted.

Of these 25 States, 5 decreased in population during the past 10 years, the largest percentage decreases being 7.5 percent for South Dakota and 6.0 percent for North Dakota. Nebraska showed a decrease of 4.7 percent, Kansas 4.4, and Oklahoma, 2.8.

Preliminary population figures have been given to date for 381 cities in the United States with a population of 25,000 or more in 1940. The total 1940 population of these cities is 51,151,024, as compared with 48,645,754 in 1930. The increase in the latest decennium is also 5.2 percent, as compared with 25.3 percent in the 1920-30 period. Of these cities, 85 recorded decreases in population in the latest census period while only 21 decreased during the 1920-30 period.

As the growth of cities is primarily due to migration from small towns, villages, and rural areas, there is an indication that the 1940 population census will show a reduction in or perhaps even a reversal of this trend. Population figures for the 1940 census so far available do not reveal to what extent other areas have benefited by this reduced trend to urbanization, but no doubt the development of and tending of population to suburban areas of large cities will account for much of the reduced rate of increase in urban population, while farm and nonfarm rural areas will account for part. A decreasing birth rate in cities may also be a minor factor.

The list of 25 of the largest cities includes practically the same cities which had this distinction in 1930, although 8 of these cities, namely, Boston, Cleveland, Newark, Philadelphia, Pittsburgh, Roch-

ester, St. Louis, and San Francisco, recorded losses in the 1940 census, and 13 changed in rank. Houston, Tex., and Denver, Colo., were included in the list for the first time, eliminating Jersey City, N. J., and Portland, Oreg. Houston made the largest upward shift in relative rank, moving from twenty-sixth to twenty-first place, while Jersey City showed the largest drop—from twenty-third to thirtieth. Washington, D. C., moved up from fourteenth to eleventh place. Following is the list of the 25 largest cities in the United States, by rank, according to preliminary figures of the 1940 census, with populations in 1940 and 1930. Final check by the Bureau of the Census may result in some changes, but is not likely to change the relative standing.

1940 rank	1940 population	1930 population	1940 rank	1940 population	1930 population
1. New York.....	7,380,259	6,930,446	14. Buffalo.....	575,150	573,076
2. Chicago.....	3,384,556	3,376,438	15. New Orleans.....	492,282	458,762
3. Philadelphia.....	1,935,086	1,950,961	16. Minneapolis.....	489,976	464,351
4. Detroit.....	1,618,549	1,568,662	17. Cincinnati.....	452,852	451,160
5. Los Angeles.....	1,496,792	1,238,048	18. Newark.....	428,236	442,337
6. Cleveland.....	878,335	900,429	19. Kansas City.....	400,175	399,746
7. Baltimore.....	854,144	804,874	20. Indianapolis.....	386,170	364,161
8. St. Louis.....	813,748	821,960	21. Houston.....	386,150	292,352
9. Boston.....	769,520	781,188	22. Seattle.....	366,847	365,583
10. Pittsburgh.....	665,384	669,817	23. Rochester.....	324,694	328,132
11. Washington.....	663,153	486,869	24. Louisville.....	318,713	307,745
12. San Francisco.....	629,553	634,394	25. Denver.....	318,415	287,861
13. Milwaukee.....	589,558	578,249			

HAY FEVER AND ASTHMA *

Definition.

Hay fever is a coryza (swelling of the mucous lining of the nose) and irritation of the eyes occurring in individuals who are sensitive to certain substances either in the air, in their diet, or in their environment. When this reaction occurs in the bronchial tubes, the swelling causes a difficult wheezy type of breathing and the condition is known as asthma. This peculiar make-up which causes persons to become sensitive is called allergy.

Occurrence.

Hay fever and asthma are two of the most common of our nonfatal diseases, occurring in individuals of all ages and races. From a recent survey made by the National Institute of Health, it is estimated that about 5 percent of the population of the United States suffer from these disorders. Three seasonal varieties of hay fever are observed:

1. The spring type which begins at the end of March and extends to the end of May and is due to the pollen of trees such as the oak, elm, and birch.

*This material is available in leaflet form and a limited number of copies may be obtained by addressing the Surgeon General, U. S. Public Health Service, Washington, D. C.

2. The summer type, beginning at the end of May and extending to the middle of July, is caused by the pollens of grasses and sorrel.

3. The fall type which begins in the middle of August and continues until frost with the pollens of the ragweed mainly responsible.

Dietary and environmental causes are always present.

Symptoms.

There is a puffiness and itching of the eyelids, with a tendency to tears and discomfort on exposure of the eyes to light. The mucous lining of the nose swells, and the profuse watery discharge and sneezing are the cause of much annoyance. Headache is common and may be severe. Local or general swelling of the skin with itching (hives) may occur. With asthma, there is a tendency to wheeze on breathing, expectoration of clear mucous sputum, and spasmodic cough.

Diagnosis.

Recognition of these conditions is easy; it is the discovery of the specific causes of hay fever and asthma which presents a difficult problem to the physician. Certain tests of the skin, eye, nose, and diet are valuable aids. The patient should not expect a complete diagnosis on his first or second visit to a physician. After one cause is found, others must be sought in case of recurrence. It is reported that over 50 percent of hay fever patients are sensitive to more than one agent.

Outcome.

The hope of permanent relief from attacks of hay fever and asthma depends entirely upon the recognition of the cause and the possibility of its removal. Infection of the sinuses occurs in a large percentage of cases, but in only a relatively small percentage does this become important enough to need special treatment. Approximately 90 percent of treated individuals are greatly relieved, the greatest relief usually being observed by those who also suffer from asthma.

Treatment.

Success in treatment depends primarily on a correct and complete diagnosis. Extracts of the various agents responsible for the illness are injected in very small doses and then gradually increased until the patient is able to withstand many times the initial dose. This procedure is termed "desensitizing." The series of injections is timed so that the maximum dose is reached just before the onset of symptoms. With the intelligent cooperation of the patient, a physician can now give these injections safely and in many cases without discomfort or reactions. This treatment is effective for one season only.

The physician can prescribe certain drugs which, applied locally, serve greatly to relieve nose and eye symptoms.

Climate.

A person who blindly tries one locality after another in an effort to find relief is likely to waste time and money unless he knows the source of his illness. There is no particular locality in which the patient suffering from the spring or summer type of hay fever may be assured of complete relief except upon the ocean. For the autumnal type, the White Mountains, northern Maine and the mountain States, the southern tip of Florida, and the region west of the Rocky Mountains are recommended. At present there are air-conditioning machines on the market which may give relief to hay-fever sufferers.

Prevention.

Since heredity plays so important a part in these diseases, prompt attention to sensitizing agents in childhood and, wherever possible, their removal from the diet and environment, are necessary measures of prevention. Proper timing of the desensitizing injections will minimize the patient's distress. Conditions of the nose and throat, such as a deflected septum or diseased tonsils, which may play a part in some patients, should be attended to.

Attention to simple hygienic measures will greatly alleviate symptoms.

The sleeping room should be kept closed during the day, the windows being opened at night when the atmosphere contains less pollen.

Long motor trips should be avoided as should also violent exercise during the pollen season.

DO NOT INDULGE IN SELF-DIAGNOSIS OR SELF-TREATMENT—CONSULT
YOUR DOCTOR

COURT DECISION ON PUBLIC HEALTH

Conviction of violation of city sanitary code in keeping unwholesome canned grapes reversed.—(New York Court of Appeals; *People v. Wallace & Co.*, 26 N.E.2d 959; decided April 16, 1940.) The defendant company was convicted of a violation of section 163 of the New York City Sanitary Code, which section provided, among other things, that no vegetables not being then wholesome or safe for human food should be brought into the city or kept, offered for sale, or sold as such food, or kept or stored anywhere in the city, and that any vegetables packed in cans, the contents of which had become fermented as evidenced by swelling or bulging, should be deemed not wholesome or safe for human food. The term "vegetables" included any article used as and for human food other than milk or meat. The case against the defendant, a candy manufacturer, was that a health department inspector had found, in a storeroom of defendant's factory, 12 cans that were swollen and bulging and which contained

grapes that had become unwholesome. These cans had been in the storeroom for at least a month. In defense the proof was that the defendant made no use of the foodstuffs kept under lock in its store-room without first inspecting them and that any article found on inspection not to be wholesome was put aside for return to the seller. There was no proof in respect of the time when the grapes had become fermented, nor was it shown that anything in respect of the time of fermentation could have been validly inferred from the swollen and bulging shape of the cans.

In considering the case on appeal by the defendant, the court of appeals said that, on such record, the judgment of guilt must mean that the defendant's mere possession of the containers made it answerable as for a crime once the ensealed grapes became unwholesome, and that the broad text of the section—that no unwholesome food should be "kept or stored anywhere in the said city"—appeared to go a long distance in that direction. "But a penal statute," stated the court, "is not necessarily to be liberally applied in all circumstances." It was said to be the court's best judgment that no considerations of expediency required such unfairness as would result were section 163 to be so freely construed as to force its application to the facts which in the instant case were found below. The judgments were reversed and the information dismissed.

DEATHS DURING WEEK ENDED SEPTEMBER 7, 1940

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Sept. 7, 1940	Correspond- ing week, 1939
Data from 88 large cities of the United States:		
Total deaths.....	7,313	7,117
Average for 3 prior years.....	6,928	-
Total deaths, first 36 weeks of year.....	307,328	301,247
Deaths under 1 year of age.....	444	462
Average for 3 prior years.....	479	-
Deaths under 1 year of age, first 36 weeks of year.....	18,044	18,148
Data from industrial insurance companies:		
Policies in force.....	64,915,823	66,735,832
Number of death claims.....	8,420	7,914
Death claims per 1,000 policies in force, annual rate.....	6.8	6.2
Death claims per 1,000 policies, first 36 weeks of year, annual rate.....	9.8	10.3

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED SEPTEMBER 14, 1940

Summary

The incidence of poliomyelitis again registered an increase (of 39 cases), but only about one-fourth that (152 cases) for the preceding week. For the current week, 797 cases were reported, as compared with 758 for last week, 606 for the next preceding week, and a 5-year (1935-39) median of 501.

The highest incidence continues in the East North Central and West North Central States, which reported 578 cases, or more than 72 percent of the total, about the same percentage of the total as reported last week. While increases are recorded for 7 of the 9 geographic areas, the largest are shown for the two North Central groups and the South Atlantic States. In the North Central areas, the States reporting the largest increases were as follows: Michigan, from 139 to 160; Illinois, from 40 to 59; Iowa, from 80 to 100; and Missouri, from 32 to 36. In the South Atlantic area, the number of cases in West Virginia decreased from 51 to 48, but increases in North Carolina (5 to 10), Georgia (0 to 4), Florida (0 to 2), and South Carolina (1 to 2), brought a net increase for this group of States as a whole. The incidence declined in each of the three Pacific States, which reported a total of 30 cases as compared with 40 for the preceding week.

Each of the other 8 diseases included in the following table, with the exception of influenza and measles, was below the 5-year median expectancy for the current week. Eleven cases of Rocky Mountain spotted fever were reported, only one of which was in the Rocky Mountain area, 5 cases of undulant fever, 11 cases of encephalitis (7 in Colorado), and 50 cases of typhus fever (12 in Georgia, and 11 in Texas).

For the current week, the Bureau of the Census reported 7,205 deaths in 88 major cities of the United States, as compared with 7,313 for the preceding week, and with a 3-year (1937-39) average of 7,268 for the corresponding week.

Telegraphic morbidity reports from State health officers for the week ended September 14, 1940, and comparison with corresponding week of 1939 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Med- ian, 1935- 39	Week ended		Med- ian, 1935- 39	Week ended		Med- ian, 1935- 39	Week ended		Med- ian, 1935- 39
	Sept. 14, 1940	Sept. 16, 1939		Sept. 14, 1940	Sept. 16, 1939		Sept. 14, 1940	Sept. 16, 1939		Sept. 14, 1940	Sept. 16, 1939	
NEW ENG.												
Maine	1	1	1		2		12	7	1	1	0	0
New Hampshire	0	0	0				0	2	2	0	0	0
Vermont	1	0	2				0	2	1	1	0	0
Massachusetts	0	2	2				65	22	21	1	1	1
Rhode Island	0	0	0				0	11	2	0	0	0
Connecticut	0	2	2	3		1	4	3	4	0	0	0
MID. ATL.												
New York	7	11	11	15	14	14	77	60	60	8	4	7
New Jersey	3	1	7		3	7	33	6	20	0	0	2
Pennsylvania	7	17	19				35	16	32	1	3	5
E. NO. CEN.												
Ohio	4	16	14	12	7	14	13	17	13	0	1	2
Indiana	2	14	13	3	17	9	5	1	1	0	0	1
Illinois	14	17	19	1	5	5	15	20	18	3	1	1
Michigan	0	2	9	2	2	1	44	0	10	0	1	3
Wisconsin	0	0	2	21	26	20	61	44	40	3	0	1
W. NO. CEN.												
Minnesota	1	0	4	1		2	1	6	6	0	0	0
Iowa	2	3	2	3			18	7	3	0	0	0
Missouri	1	13	21	2		11	2	5	5	1	0	1
North Dakota	1	0	1	2		2	0	2	2	0	0	0
South Dakota	1	5	1		4		1	6	0	0	1	0
Nebraska	0	1	2				1	2	2	0	0	0
Kansas	7	11	9	1		1	14	9	5	0	2	0
SO. ATL.												
Delaware	0	0	0				2	1	0	0	0	0
Maryland	2	2	6	2	1	1	2	2	5	0	1	1
Dist. of Col.	2	2	2				0	0	0	0	0	0
Virginia	8	43	33	47	42		10	9	6	0	1	1
West Virginia	6	10	11	11	9	14	3	7	3	3	2	2
North Carolina	26	72	72	2		1	3	4	4	1	2	0
South Carolina	9	12	18	148	119	112	4	7	7	0	0	0
Georgia	16	38	36	2	13		1	4	0	0	0	0
Florida	3	7	8	2			1	0	3	0	0	0
E. SO. CEN.												
Kentucky	13	8	27	5		7	3	16	12	0	0	0
Tennessee	5	22	29	3	9	9	10	4	3	1	0	3
Alabama	20	41	33	6	8	10	2	0	2	0	1	2
Mississippi	12	20	21				0		0	0	1	1
W. SO. CEN.												
Arkansas	12	25	19	1	6	6	1	10	1	0	0	0
Louisiana	8	14	10	2	1	2	0	1	1	0	0	1
Oklahoma	8	8	8	44	16	13	1	2	1	0	1	1
Texas	14	40	40	79	44	44	22	39	9	0	1	1
MOUNTAIN												
Montana	1	0	1	2			3	5	5	1	1	1
Idaho	0	1	1				0	5	3	0	0	0
Wyoming	1	0	0				0	0	1	0	1	0
Colorado	3	1	7	1	5		3	0	4	0	0	0
New Mexico	4	0	2	2			1	1	1	0	0	0
Arizona	0	0	2	13	18	18	16	2	1	0	1	0
Utah	2	0	0				6	7	3	0	0	0
PACIFIC												
Washington	3	0	0				8	48	11	1	0	0
Oregon	2	1	1	6	9	9	16	3	7	0	0	0
California	17	15	22	12	10	10	42	38	38	1	0	0
Total	249	504	565	444	385	385	561	463	463	27	27	53
37 weeks	9,707	13,646	16,640	170,891	153,176	142,573	231,174	350,169	350,169	1,218	1,479	4,380

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended September 14, 1940, and comparison with corresponding week of 1939 and 5-year median—Continued

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended		Median, 1935-39	Week ended		Median, 1935-39	Week ended		Median, 1935-39	Week ended		Median, 1935-39
	Sept. 14, 1940	Sept. 16, 1939		Sept. 14, 1940	Sept. 16, 1939		Sept. 14, 1940	Sept. 16, 1939		Sept. 14, 1940	Sept. 16, 1939	
NEW ENG.												
Maine.....	1	0	4	8	5	5	0	0	0	3	2	1
New Hampshire.....	0	0	0	2	0	0	0	0	0	0	0	0
Vermont.....	2	0	1	3	3	3	0	0	0	1	0	0
Massachusetts.....	4	4	4	37	18	34	0	0	0	1	5	5
Rhode Island.....	1	1	1	1	1	3	0	0	0	0	0	0
Connecticut.....	3	1	1	11	7	12	0	0	0	3	4	4
MID. ATL.												
New York.....	14	116	91	72	62	88	0	0	0	16	21	24
New Jersey ¹	3	28	21	24	12	16	0	0	0	5	11	11
Pennsylvania.....	14	41	38	44	61	78	0	0	0	22	11	43
E. NO. CEN.												
Ohio.....	53	13	13	52	80	83	1	0	0	8	19	41
Indiana.....	58	6	3	14	30	34	0	3	2	8	9	9
Illinois.....	59	16	18	100	52	94	0	7	0	12	82	20
Michigan ²	160	61	57	55	59	59	0	0	0	3	7	10
Wisconsin.....	31	2	4	37	56	55	0	1	1	0	0	2
W. NO. CEN.												
Minnesota.....	9	60	8	16	24	24	0	0	0	4	1	2
Iowa ¹	100	12	7	25	19	24	1	9	1	1	2	2
Missouri.....	36	2	4	15	25	29	0	1	0	10	25	25
North Dakota.....	2	1	0	0	6	5	8	0	0	1	2	1
South Dakota.....	7	2	2	3	13	11	3	1	1	0	2	1
Nebraska.....	14	5	3	1	11	11	0	1	1	0	0	0
Kansas.....	49	4	4	32	18	31	0	0	0	10	3	10
SO. ATL.												
Delaware.....	0	0	0	4	3	3	0	0	0	0	2	1
Maryland ^{2,3}	1	1	6	13	15	0	0	0	0	4	3	11
Dist. of Col.....	0	1	2	3	2	5	0	0	0	1	5	1
Virginia.....	16	3	3	13	20	20	0	0	0	21	15	18
West Virginia ²	48	0	2	16	34	31	0	0	0	8	16	23
North Carolina ^{2,4}	10	3	3	46	62	44	0	0	1	13	4	13
South Carolina ⁴	2	5	0	9	9	8	0	0	0	15	11	15
Georgia ⁴	4	0	2	12	21	10	0	0	0	13	8	13
Florida ⁴	2	4	1	1	4	4	0	0	0	4	5	3
E. SO. CEN.												
Kentucky.....	16	9	4	25	34	34	0	0	0	23	30	36
Tennessee.....	4	0	1	26	28	25	0	0	0	20	12	16
Alabama ⁴	1	1	3	15	19	17	0	0	0	12	9	11
Mississippi ^{2,4}	3	2	4	11	6	8	0	0	0	9	4	9
W. SO. CEN.												
Arkansas.....	1	1	1	11	9	6	0	1	0	26	14	14
Louisiana ⁴	3	0	1	1	7	4	0	0	0	13	15	17
Oklahoma ²	8	1	1	16	9	9	1	8	0	12	23	23
Texas ⁴	8	12	2	12	25	24	0	0	0	47	49	49
MOUNTAIN												
Montana ²	4	0	0	11	10	15	0	2	2	2	1	3
Idaho.....	3	0	0	0	2	2	0	0	0	12	3	4
Wyoming.....	2	0	0	1	3	4	0	0	0	2	7	0
Colorado.....	4	18	4	13	20	9	0	7	2	7	4	4
New Mexico.....	2	8	1	2	6	6	0	0	0	3	1	16
Arizona.....	0	8	3	2	0	2	0	0	0	0	3	3
Utah ²	5	4	1	8	15	15	0	0	0	1	0	0
PACIFIC												
Washington.....	12	1	1	10	17	17	0	0	5	1	2	6
Oregon.....	4	2	2	3	10	16	0	0	0	2	7	5
California.....	14	42	19	55	72	75	0	1	1	10	8	11
Total.....	797	501	501	884	1,022	1,182	14	42	42	389	468	604
37 weeks.....	4,856	3,955	3,955	121,688	119,962	168,788	2,002	8,763	8,184	6,636	9,211	10,441

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended September 14, 1940, and comparison with corresponding week of 1939 and 5-year median—Continued

Division and State	Whooping cough		Division and State	Whooping cough	
	Week ended			Week ended	
	Sept. 14, 1940	Sept. 16, 1939		Sept. 14, 1940	Sept. 16, 1939
NEW ENG.			SO. ATL.—continued		
Maine.....	27	35	South Carolina ¹	26	14
New Hampshire.....	0	0	Georgia ¹	7	14
Vermont.....	1	36	Florida ¹	1	11
Massachusetts.....	130	134			
Rhode Island.....	1	31	E. SO. CEN.		
Connecticut.....	25	69	Kentucky.....	79	39
			Tennessee.....	29	33
MID. ATL.			Alabama ¹	11	15
New York.....	255	408	Mississippi ¹		
New Jersey ²	135	135			
Pennsylvania.....	336	332	W. SO. CEN.		
			Arkansas.....	5	5
E. NO. CEN.			Louisiana ¹	6	37
Ohio.....	220	162	Oklahoma ²	8	11
Indiana.....	31	45	Texas ¹	96	47
Illinois.....	112	275			
Michigan ³	285	170	MOUNTAIN		
Wisconsin.....	127	138	Montana ¹	8	7
			Idaho.....	0	0
W. NO. CEN.			Wyoming.....	1	4
Minnesota.....	57	72	Colorado.....	15	11
Iowa ¹	17	7	New Mexico.....	6	46
Missouri.....	41	19	Arizona.....	3	15
North Dakota.....	4	32	Utah ²	22	44
South Dakota.....	9	4			
Nebraska.....	2	6	PACIFIC		
Kansas.....	33	35	Washington.....	53	16
			Oregon.....	11	16
SO. ATL.			California.....	228	87
Delaware.....	12	8			
Maryland ²	65	39	Total.....	2,724	2,799
Dist. of Col.....	4	26			
Virginia.....	56	28	37 weeks.....	117,570	137,038
West Virginia ³	38	2			
North Carolina ²	86	79			

¹ New York City only.

² Rocky Mountain spotted fever, week ended Sept. 14, 1940, 11 cases as follows: New Jersey, 1; Iowa, 1; Maryland, 2; North Carolina, 3; Oklahoma, 3; Montana, 1.

³ Period ended earlier than Saturday.

⁴ Typhus fever, week ended Sept. 14, 1940, 50 cases as follows: North Carolina, 7; South Carolina, 7; Georgia, 12; Florida, 5; Alabama, 5; Mississippi, 1; Louisiana, 2; Texas, 11.

⁵ Delayed report has been received of 13 cases of poliomyelitis in New York City for the period Mar. 10 to Aug. 16.

PLAGUE INFECTION IN FLEAS FROM GROUND SQUIRRELS IN SUBLETTE COUNTY, WYOMING

Under date of August 28, 1940, Surgeon L. B. Byington reported plague infection proved in a pool of 15 fleas from 12 ground squirrels (*C. armatus*) shot on August 7, 8 to 10 miles north of Kendal Ranger Station, Sublette County, Wyo.

MONTHLY REPORTS FROM STATES

Case reports consolidated for the quarter April-June 1940

[Diseases covered by weekly telegraphic reports not included]

Division and State	Chick- enpox	Dysen- tery, amoebic	Dysen- tery, bacil- lary	Dysen- tery, epi- demic or lethar- gic	Ger- man measles	Hook- worm disease	Mal- aria	Mumps	Oph- thal- mia neona- torum	Pella- gra	Puer- peral sepi- cemia	Rabies in animals	Rabies in man	Septic sore throat	Tra- cho- ma	Tub- er- cu- losis	Unde- r- ling fever
NEW ENG.																	
Maine.....	588				100			40	2					5			9
New Hampshire.....	115							34									15
Vermont.....	376				28			228									15
Massachusetts.....	3,344	1	50	5	229		3	2,340	244	3		19		67	3		6
Rhode Island.....	296				19			161				7		47			6
Connecticut.....	1,619		3	3	58		4	855						84	1		16
MID. ATL.																	
New York.....	9,266	12	85	42	735		41	5,665	125			31		454		1	47
New Jersey.....	4,388	2	2	5	284		3	3,054	42			170	2	40	1		21
Pennsylvania.....	10,432	2		5	277				11	1			1			9	30
E. NO. CEN.																	
Ohio.....	5,060		41	6	137		4	2,189		1	5		2	33	16		19
Indiana.....	6,602						2	1,381				85		3		2	21
Illinois.....	6,341	13	24	6	164		2	2,168	11	5		71		14	64	8	31
Michigan.....	5,461		4	2	207		16					13		405		1	29
Wisconsin.....	5,700	1			133			3,610	2					67		3	33
W. NO. CEN.																	
Minnesota.....	1,760	9	106	4			1			1						3	37
Iowa.....	524		1	20	7		28	1,158		1		20		16		3	55
Missouri.....	451		12	9	2		15	229				2	1	22	103	8	7
North Dakota.....	367							236						2			1
South Dakota.....	161							130						5	14		2
Nebraska.....	332			1				565									1
Kansas.....	1,019	2	1	10	34		5	585						19	2	4	83

SO. ATL.	135 1,066 409 660 228 1,376 445 469 687	2 2 2 2 2 19 9	1 14 247 35 2 62 2	2 2 1 1 2 14 2	3 17 29 54 26 36 93	8 243 262 64 140 381 139	1 29 59 2,338 5,209 1,940	9 310 974 10,362	4 37 62 1,352	5 107 67 23	201 107 44 17	1 85 408 24 40 385 11	1 2 4 3 1 3	1 2 1 37 48 100 8	2 2 1 1 8 20	8 243 262 64 140 381 139	9 310 974 10,362	4 37 62 1,352	5 107 67 23	201 107 44 17	1 85 408 24 40 385 11	1 2 4 3 1 3	1 2 1 37 48 100 8	2 2 1 1 8 20		
E. SO. CEN.	751 458 403 1,038	2 3 493	5 28 3,129	3 2 12	418 97 203	9 384 373 1,360	9 310 974 10,362	9 310 974 10,362	4 37 62 1,352	5 107 67 23	201 107 44 17	1 85 408 24 40 385 11	1 2 4 3 1 3	1 2 1 37 48 100 8	2 2 1 1 8 20	8 243 262 64 140 381 139	9 310 974 10,362	4 37 62 1,352	5 107 67 23	201 107 44 17	1 85 408 24 40 385 11	1 2 4 3 1 3	1 2 1 37 48 100 8	2 2 1 1 8 20		
W. SO. CEN.	228 115 277 1,849	21 7 6 134	33 3 31 1,118	1 1 3 3	1 16 2 2	248 42 151 820	861 80 429 1,493	861 80 429 1,493	2 170 33 407	5 16 33 407	294 16 12 25 47	78 16 12 22 47	3 27 67 4	49 27 67 4	2 170 33 407	248 42 151 820	861 80 429 1,493	861 80 429 1,493	2 170 33 407	5 16 33 407	294 16 12 25 47	78 16 12 22 47	3 27 67 4	49 27 67 4		
MOUNTAIN	418 219 54 497 429 210 574 187	4 2 2 1 4 2	4 219 54 497 429 210 574 187	14 2 2 2 6 33 82	7 7 9 11 33 82	176 73 229 3,441 141 897 10	1 73 229 3,441 141 897 10	1 73 229 3,441 141 897 10	2 170 33 407	5 16 33 407	294 16 12 25 47	78 16 12 22 47	3 27 67 4	49 27 67 4	2 170 33 407	248 42 151 820	861 80 429 1,493	861 80 429 1,493	2 170 33 407	5 16 33 407	294 16 12 25 47	78 16 12 22 47	3 27 67 4	49 27 67 4		
PACIFIC	1,482 535 7,218	2 3 40	8 3 139	1 9	109 3 269	1 940 5,695	1 940 5,695	1 940 5,695	2 170 33 407	5 16 33 407	294 16 12 25 47	78 16 12 22 47	3 27 67 4	49 27 67 4	2 170 33 407	248 42 151 820	861 80 429 1,493	861 80 429 1,493	2 170 33 407	5 16 33 407	294 16 12 25 47	78 16 12 22 47	3 27 67 4	49 27 67 4		
Total	81,547	796	5,201	326	181	3,825	9,254	17,609	408	2,817	90	866	11	2,932	864	226	908	908	2,932	864	226	908	908	2,932	864	226
Alaska	32				4	1	30	2	2	10	27															
Hawaii	272	6			14	73		6,147																		
Puerto Rico	187			147		6																				

:Reports for March, April, and May, 1940.

1 Exclusive of New York City.

Case reports consolidated for the quarter April-June 1940—Continued

Division and State	Actinomyosis	Anthrax	Beriberi	Botulism	Dengue	Food poisoning	Granuloma, coccioid	Leprosy	Psittacosis	Relapsing fever	Tetanus	Trichinosis	Vincent's infection	Well's disease
NEW ENG.														
Maine.....												1	9	
New Hampshire.....													12	
Vermont.....											6	18		
Massachusetts.....	1	1												
Rhode Island.....											1	7		
Connecticut.....														
MID. ATL.														
New York.....		9									10	82	101	
New Jersey.....		3									4	3		
Pennsylvania.....		2										1		
E. NO. CEN.														
Ohio.....		1									4	11		
Indiana.....											2			
Illinois.....	1										7	5	92	
Michigan.....	2										2	5	54	4
Wisconsin.....														
W. NO. CEN.														
Minnesota.....	5								2		2	1		
Iowa.....														
Missouri.....											2			
North Dakota.....	1												10	
South Dakota.....														
Nebraska.....														
Kansas.....	1					2					1	1	42	
SO. ATL.														
Delaware.....														
Maryland.....											6	3	35	
Dist. of Col.....														
Virginia.....											1			
West Virginia.....														
North Carolina.....													59	
South Carolina.....					7						4			
Georgia.....											5			
Florida.....								1			3		16	

E. SO. CEN.										
Kentucky.....									2	12
Tennessee.....									6	
Alabama.....										
Mississippi.....					5					
W. SO. CEN.										
Arkansas.....	1								3	
Louisiana.....						7			11	
Oklahoma.....								9	1	5
Texas.....					1	3				
MOUNTAIN										
Montana.....	1								1	
Idaho.....										
Wyoming.....										2
Colorado.....										2
New Mexico.....	1									
Arizona.....										
Utah.....										1
Nevada.....										
PACIFIC										
Washington.....	1								1	3
Oregon.....										15
California.....		2	1			10	2	1	17	9
Total.....	13	18	2	1	13	10	13	10	102	147
Alaska.....										470
Hawaii.....										2
Puerto Rico ¹									10	1
									44	

¹ Exclusive of New York City.² Reports for March, April, and May, 1940.

WEEKLY REPORTS FROM CITIES

City reports for week ended August 31, 1940

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Small-pox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	87	31	11	155	267	249	2	332	80	1,145	-----
Current week ¹	37	35	13	226	192	179	3	320	55	824	-----
Maine:											
Portland	0	-----	0	0	0	0	0	0	0	1	24
New Hampshire:											
Concord	0	-----	0	0	0	0	0	0	0	0	5
Nashua	0	-----	0	0	0	1	0	0	0	0	4
Vermont:											
Barre	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Burlington	0	-----	0	0	0	0	0	0	0	0	9
Rutland	0	-----	0	0	1	0	0	0	0	0	10
Massachusetts:											
Boston	0	-----	0	13	5	3	0	10	0	33	197
Fall River	0	-----	0	1	1	0	0	0	0	9	17
Springfield	0	-----	0	0	0	1	0	2	0	1	29
Worcester	0	-----	0	9	4	2	0	2	0	3	62
Rhode Island:											
Pawtucket	0	-----	0	0	0	0	0	0	0	0	10
Providence	0	-----	0	2	0	2	0	2	0	1	52
Connecticut:											
Bridgeport	0	-----	0	0	0	1	0	1	2	1	34
Hartford	0	-----	0	0	0	3	0	2	0	0	34
New Haven	0	-----	0	0	1	2	0	0	1	9	31
New York:											
Buffalo	0	-----	0	0	4	3	0	5	0	5	109
New York	4	6	-----	50	34	11	0	67	11	118	1,213
Rochester	0	-----	0	0	4	0	0	1	0	13	64
Syracuse	0	-----	0	2	4	2	0	1	0	6	33
New Jersey:											
Camden	0	1	1	0	0	3	0	2	0	0	31
Newark	0	-----	0	10	1	3	0	5	0	17	76
Trenton	0	-----	0	0	2	1	0	3	2	2	34
Pennsylvania:											
Philadelphia	0	2	2	13	4	9	0	18	2	54	352
Pittsburgh	0	-----	2	2	5	4	0	6	1	14	131
Reading	0	-----	0	4	1	0	0	3	0	12	19
Scranton	0	-----	0	0	-----	0	0	-----	0	0	-----
Ohio:											
Cincinnati	0	-----	0	0	1	2	0	6	0	12	119
Cleveland	1	14	2	3	8	4	0	13	0	55	164
Columbus	1	-----	0	1	0	0	0	0	0	9	63
Toledo	0	-----	0	0	3	5	0	1	3	10	55
Indiana:											
Fort Wayne	1	-----	0	0	1	1	0	0	0	0	17
Indianapolis	0	-----	0	0	3	5	0	3	0	2	97
Muncie	0	-----	0	0	0	0	0	0	0	0	8
South Bend	0	-----	0	0	2	0	0	2	0	0	20
Terre Haute	0	-----	0	0	1	0	0	0	0	0	16
Illinois:											
Alton	0	-----	0	0	0	0	0	0	0	0	5
Chicago	5	2	1	15	16	28	0	33	3	80	606
Elgin	0	-----	0	0	0	0	0	0	0	0	6
Moline	0	-----	0	0	0	0	0	0	0	0	12
Springfield	0	-----	0	0	2	2	0	1	0	7	21
Michigan:											
Detroit	2	-----	0	29	2	21	0	10	0	79	232
Flint	1	-----	0	0	3	0	0	1	0	1	38
Grand Rapids	0	-----	0	0	0	2	0	0	0	21	36
Wisconsin:											
Kenosha	0	-----	0	0	0	0	0	0	0	0	8
Madison	0	-----	0	3	0	1	0	0	0	1	12
Milwaukee	0	-----	1	26	1	5	0	3	0	7	69
Racine	0	-----	0	2	0	5	0	0	0	3	10
Superior	1	-----	0	0	0	1	0	0	0	0	10
Minnesota:											
Duluth	0	-----	0	0	1	0	3	0	0	1	20
Minneapolis	2	-----	0	0	2	4	0	1	0	0	86
St. Paul	0	-----	0	0	0	5	0	1	1	0	55

¹ Figures for Barre and Shreveport estimated; reports not received.

City reports for week ended August 31, 1940—Continued

State and city	Diph- theria cases	Influenza		Meas- les cases	Pneu- monia deaths	Scar- let fever cases	Small- pox cases	Tuber- culosis deaths	Ty- phoid fever cases	Whoop- ing cough cases	Deaths, all causes
		Cases	Deaths								
Iowa:											
Cedar Rapids..	0	-----	-----	0	-----	0	0	-----	0	0	-----
Davenport.....	0	-----	-----	0	-----	1	0	-----	0	0	-----
Des Moines.....	16	-----	0	0	0	1	0	0	0	0	29
Sioux City.....	0	-----	-----	0	-----	0	-----	-----	1	0	-----
Waterloo.....	0	-----	-----	0	-----	1	0	-----	0	1	-----
Missouri:											
Kansas City.....	0	-----	1	2	3	4	0	1	2	2	79
St. Joseph.....	0	-----	0	0	1	0	0	0	0	1	19
St. Louis.....	3	-----	0	0	7	4	0	5	0	13	181
North Dakota:											
Fargo.....	0	-----	0	0	1	0	0	0	0	0	8
Grand Forks.....	0	-----	-----	0	-----	0	-----	-----	0	1	-----
Minot.....	0	-----	0	0	0	0	0	0	0	0	5
South Dakota:											
Aberdeen.....	0	-----	-----	0	-----	0	-----	-----	0	1	-----
Sioux Falls.....	0	-----	0	0	0	0	0	0	0	0	9
Nebraska:											
Lincoln.....	0	-----	-----	0	-----	1	0	-----	0	3	-----
Omaha.....	0	-----	0	0	1	0	0	2	1	1	45
Kansas:											
Lawrence.....	0	-----	0	0	1	0	0	0	0	0	4
Topeka.....	0	-----	0	2	1	2	0	3	0	4	19
Wichita.....	0	-----	0	0	3	1	0	1	2	0	37
Delaware:											
Wilmington.....	0	-----	0	0	0	0	0	0	0	1	28
Maryland:											
Baltimore.....	1	2	0	2	4	1	0	7	0	58	154
Cumberland.....	0	-----	0	0	0	0	0	0	0	0	14
Frederick.....	0	-----	0	0	0	0	0	0	0	0	1
Dist. of Col.:											
Washington.....	2	-----	0	3	4	4	0	17	4	9	149
Virginia:											
Lynchburg.....	2	-----	0	0	1	0	0	0	0	1	8
Norfolk.....	0	-----	0	0	2	0	0	0	0	3	21
Richmond.....	0	-----	0	0	0	0	0	1	0	0	33
Roanoke.....	0	-----	0	0	1	0	0	0	0	7	8
West Virginia:											
Charleston.....	0	1	0	0	0	0	0	0	0	0	12
Huntington.....	0	-----	0	0	0	0	0	0	0	0	2
Wheeling.....	0	-----	0	0	0	1	0	0	0	2	17
North Carolina:											
Gastonia.....	0	-----	-----	0	-----	0	-----	-----	0	3	-----
Raleigh.....	0	-----	0	0	1	0	0	2	0	0	17
Wilmington.....	1	-----	0	0	2	1	0	0	0	0	10
Winston-Salem.....	1	1	0	0	0	0	0	0	0	20	21
South Carolina:											
Charleston.....	0	2	0	10	4	0	0	1	0	0	26
Florence.....	0	-----	0	0	2	0	0	0	0	0	16
Greenville.....	0	-----	0	0	1	0	0	0	0	1	8
Georgia:											
Atlanta.....	0	-----	0	0	1	1	0	6	2	2	89
Brunswick.....	0	-----	0	0	0	0	0	0	0	0	6
Savannah.....	1	-----	0	0	0	0	0	5	0	2	28
Florida:											
Miami.....	0	3	0	0	4	0	0	1	0	0	25
Tampa.....	1	-----	0	1	1	0	0	0	0	0	28
Kentucky:											
Ashland.....	0	1	0	0	0	0	0	1	1	0	9
Covington.....	0	-----	0	0	0	0	0	2	0	0	18
Lexington.....	0	-----	0	10	3	0	0	1	0	2	14
Louisville.....	1	-----	0	0	1	1	0	4	1	8	65
Tennessee:											
Memphis.....	0	-----	2	0	0	3	0	8	4	13	90
Nashville.....	0	-----	0	0	0	1	0	2	0	7	56
Alabama:											
Birmingham.....	0	2	0	4	2	2	0	2	3	0	58
Mobile.....	0	-----	0	0	1	1	0	1	0	0	24
Montgomery.....	1	-----	-----	0	-----	0	-----	-----	0	1	-----
Arkansas:											
Fort Smith.....	0	-----	-----	0	-----	0	-----	-----	0	0	-----
Little Rock.....	0	-----	-----	0	-----	0	-----	-----	0	0	-----
Louisiana:											
New Orleans.....	2	-----	0	0	11	0	0	9	2	3	148
Shreveport.....	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Oklahoma:											
Oklahoma City.....	0	-----	0	0	5	2	0	1	0	0	49
Tulsa.....	0	-----	0	0	1	0	0	2	2	1	21

City reports for week ended August 31, 1940—Continued

State and city	Diph- theria cases	Influenza		Mea- sles cases	Pneu- monia deaths	Scar- let fever cases	Small- pox cases	Tuber- culosis deaths	Ty- phoid fever cases	Whoop- ing cough cases	Deaths, all causes
		Cases	Deaths								
Texas:											
Dallas.....	0	-----	0	1	1	1	0	0	1	4	57
Fort Worth.....	0	-----	0	3	2	0	0	0	1	17	30
Galveston.....	0	-----	0	0	0	0	0	0	2	0	15
Houston.....	1	-----	0	1	7	0	0	7	2	2	89
San Antonio.....	1	-----	0	0	4	0	0	7	2	5	58
Montana:											
Billings.....	0	-----	0	1	0	1	0	0	0	1	7
Great Falls.....	0	-----	0	3	0	0	0	0	0	0	9
Helena.....	0	-----	0	0	0	0	0	0	0	0	1
Missoula.....	0	-----	0	0	0	2	0	0	0	0	11
Idaho:											
Boise.....	0	-----	0	0	1	0	0	0	0	0	8
Colorado:											
Colorado Springs.....	0	-----	0	0	1	0	0	1	0	0	10
Denver.....	0	-----	0	3	2	1	0	2	0	3	87
Pueblo.....	0	-----	0	0	0	0	0	0	1	0	4
New Mexico:											
Albuquerque.....	0	-----	0	0	0	0	0	1	0	0	10
Utah:											
Salt Lake City.....	0	-----	0	3	0	2	0	0	0	18	27
Washington:											
Seattle.....	0	-----	1	2	2	1	0	2	1	7	84
Spokane.....	0	-----	0	0	0	0	0	0	0	0	30
Tacoma.....	0	-----	0	0	1	0	0	1	0	0	27
Oregon:											
Portland.....	0	-----	0	0	0	3	0	1	0	0	73
Salem.....	0	-----	-----	0	-----	0	-----	-----	0	2	-----
California:											
Los Angeles.....	2	1	0	6	1	10	0	13	3	47	280
Sacramento.....	0	-----	0	0	2	0	0	2	0	1	28
San Francisco.....	0	1	0	0	6	0	0	6	0	14	152

State and city	Meningitis, meningococcus		Polio- mye- litis cases	State and city	Meningitis, meningococcus		Polio- mye- litis cases
	Cases	Deaths			Cases	Deaths	
Maine:				Iowa—Continued.			
Portland.....	0	0	1	Sioux City.....	0	0	3
Massachusetts:				Waterloo.....	0	0	11
Worcester.....	0	1	1	Missouri:			
Rhode Island:				Kansas City.....	1	0	11
Providence.....	0	0	1	South Dakota:			
New York:				Aberdeen.....	1	0	0
New York.....	0	0	10	Nebraska:			
Rochester.....	0	0	1	Lincoln.....	0	0	1
New Jersey:				Omaha.....	0	0	7
Camden.....	0	0	1	Kansas:			
Newark.....	0	0	1	Topeka.....	0	0	1
Pennsylvania:				Wichita.....	0	0	4
Philadelphia.....	0	0	9	Maryland:			
Pittsburgh.....	1	0	2	Baltimore.....	1	0	1
Scranton.....	0	0	1	Virginia:			
Ohio:				Norfolk.....	0	0	2
Cincinnati.....	0	0	1	Richmond.....	0	0	1
Cleveland.....	0	0	2	West Virginia:			
Toldeo.....	0	0	1	Huntington.....	0	0	3
Indiana:				Kentucky:			
Fort Wayne.....	0	0	6	Louisville.....	0	0	1
Indianapolis.....	0	0	3	Alabama:			
Muncie.....	0	0	5	Birmingham.....	1	0	1
South Bend.....	0	0	2	Louisiana:			
Illinois:				New Orleans.....	0	0	2
Chicago.....	0	0	9	Oklahoma:			
Michigan:				Oklahoma City.....	1	0	0
Detroit.....	0	0	6	Texas:			
Flint.....	0	0	1	Houston.....	0	0	1
Grand Rapids.....	0	0	4	Montana:			
Minnesota:				Billings.....	0	0	1
Minneapolis.....	0	0	3	Helena.....	0	0	2
Iowa:				Missoula.....	0	0	3
Cedar Rapids.....	0	0	2	Washington:			
Davenport.....	0	0	1	Seattle.....	0	0	1
Des Moines.....	0	0	4	Tacoma.....	0	0	1
				California:			
				Los Angeles.....	0	0	4

Encephalitis, epidemic or lethargic.—Cases: Newark, 1; Philadelphia, 1; Waterloo, 1; Omaha, 2; Topeka, 2; San Francisco, 1.

Pellagra.—Cases: Chicago, 1; Savannah, 2; Dallas, 1.

Typhus fever.—Cases: Atlanta, 2; Brunswick, 1; Mobile, 1; Montgomery, 1; New Orleans, 2; Dallas, 2; Houston, 1.

FOREIGN REPORTS

CUBA

Provinces—Notifiable diseases—4 weeks ended July 20, 1940.—During the 4 weeks ended July 20, 1940, cases of certain notifiable diseases were reported in the Provinces of Cuba, as follows:

Disease	Pinar del Rio	Habana	Matan- zas	Santa Clara	Cama- gney	Oriente	Total
Cancer.....		2	2	10		12	26
Diphtheria.....		9	1			4	14
Hookworm disease.....				1			1
Leprosy.....				2	1		3
Malaria.....	3	2		7		37	49
Measles.....		6		1		5	12
Poliomyelitis.....		5					5
Scarlet fever.....				1			1
Tetanus, infantile.....	1						1
Tuberculosis.....	14	71	12	47	9	30	183
Typhoid fever.....	18	138	15	37	24	37	269

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—A cumulative table giving current information regarding the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS of August 30, 1940, pages 1594-1597. A similar table will appear in future issues of the PUBLIC HEALTH REPORTS for the last Friday of each month.

Cholera

China—Foochow.—Cholera has been reported in Foochow, China, as follows: For the month of August 1940, 29 cases, 14 deaths; September 3 and 4, 1940, 11 deaths.

Plague

Tunisia—Tunis.—For the period August 31 to September 5, 1940, 2 cases of plague were reported in Tunis, Tunisia.

United States—Wyoming—Sublette County.—A report of plague infection in Sublette County, Wyo., appears on page 1747 of this issue of PUBLIC HEALTH REPORTS.